Service Manual

SA12 /F1N, /N1G, /S1G, /U1B

Super Audio CD Player

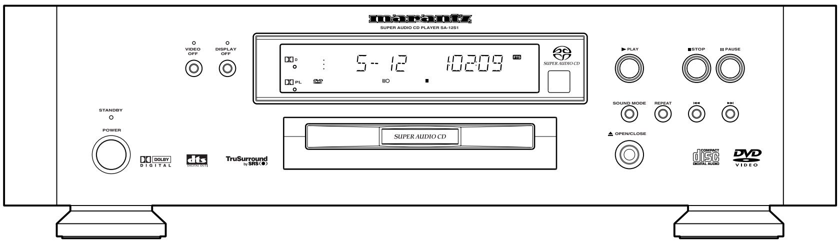


TABLE OF CONTENTS

Please use this service manual with referring to the user guide (D.F.U.) without fail.
修理の際は、必ず取扱説明書を準備し操作方法を確認の上作業を行ってください。

marantz®

SA-12S1

413K855010 MIT
3120 785 22750
First Issue 2001.09

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SHOCK, FIRE HAZARD SERVICE TEST :

CAUTION : After servicing this appliance and prior to returning to customer, measure the resistance between either primary AC cord connector pins (with unit NOT connected to AC mains and its Power switch ON), and the face or Front Panel of product and controls and chassis bottom.

Any resistance measurement less than 1 Megohms should cause unit to be repaired or corrected before AC power is applied, and verified before it is return to the user/customer.

Ref. UL Standard No. 1492.

In case of difficulties, do not hesitate to contact the Technical Department at above mentioned address.

1. Technical specifications

SACD/CD

Audio characteristics		Super Audio CD	CD
Channels		6 channels (Max.)	2 channels
Frequency range		2 Hz - 100 kHz	2 Hz - 20 kHz
Frequency characteristics		2 Hz - 50 kHz (-3 dB)	2 Hz - 20 kHz
Dynamic range		114 dB	more than 100 dB
THD (1 kHz)		0.0008 %	0.0013 %
Analog output level		2.0 V	2.0 V
Digital output	Output level (coaxial)	-	0.5 Vp-p (75 ohm)
	Output level (optical)	-	-19 dBm
Format		**1 bit DSD**	**16 bit linear PCM**
Sampling frequency		2.8224 MHz	44.1 kHz
Optical readout system			
Laser type		AlGaAs	AlGaAs
Wavelength		650 nm	780 nm

DVD/VCD

Video	Format	MPEG1 (VCD) / MPEG2 (DVD)
	Horizontal	resolution more than 500
Audio	Format	PCM (16/20/24 bit, 48/96 kHz fs) / Dolby Digital / MPEG
	Frequency characteristics	2 Hz - 22 kHz (PCM 48 kHz), 2 Hz - 44 kHz (PCM 96 kHz)
	Dynamic range	114 dB (PCM 24 bit)
	THD (1 kHz)	0.0013 % (PCM 24 bit)
Digital output		PCM, Dolby Digital, DTS, MPEG (F, U version)
Video output		Composite / S / Components

* Audio characteristics are for multi channel output.

Power Supply

N version .... AC 115/230 V, 60 Hz
S version .... AC 115/230 V, 60 Hz
F version .... AC 100 V 50/60 Hz
U version .... AC 120 V 60 Hz
Power consumption (N version) .... 33 W
Power consumption (S, F, U version) .... 30 W

Cabinet

Dimensions .... 458 (W) x 126 (H) x 379 (D) mm
Weight .... 11 kg
Operating temperatures .... +5 °C to +35 °C
Operating humidity .... 5% - 90% (without dew)

Accessories

Remote control unit (RC-12SAS1) 1
Battery (AAA) 2
Stereo audio cable 3
Audio-Video cable 1
Remote control cord 1
Users guide 1
AC power cord 1
Registration card (N, F, U version) 1

SCART CONNECTOR

SCART II (connected to TV)

Pin	signals:		
1	Output	Audio R	1.8 Vrms
2	Input	Audio R	
3	Output	Audio L	1.8 Vrms
4		Audio GND	
5		Blue/Chroma GND	
6	Input	Audio L	
7	Bi-dir	Blue out/Chroma in	0.7 Vpp +/- 0.1 V into 75 Ohm (*)
8	Output	Function switch	< 2 V = TV > 4.5 V / < 7 V = asp. Ratio 16:9 DVD > 9.5 V / < 12 V = asp. ratio 4:3 DVD
9		Green GND	
10	not connected		
11	Output	Green	0.7 Vpp +/- 0.1 V into 75 Ohm (*)
12	not connected		
13		Red/Chroma GND	
14		fast switch GND	
15	Output	Red out/Chroma out	0.7 Vpp +/- 0.1 V into 75 Ohm (*) +/- 3 dB 0.3 Vpp Chroma (burst)
16	Output	fast switch RGB/CVBS or Y	< 0.4 V into 75 Ohm = CVBS > 1 V / < 3 V into 75 Ohm = RGB
17		Y/CVBS GND	
18		fast switching GND	
19	Output	CVBS/Y/RGB sync	1 Vpp +/- 0.1 V into 75 Ohm (*)
20	Input	CVBS/Y	
21		Shield	

SCART I (connected to AUX)

Pin	signals:		
1	Output	Audio R	1.8 Vrms
2	Input	Audio R	
3	Output	Audio L	1.8 Vrms
4		Audio GND	
5		Blue/Chroma GND	
6	Input	Audio L	
7	Bi-dir	Blue in/Chroma out	+/- 3 dB 0.3 Vpp Chroma (burst)
8	Input	Function switch	
9		Green GND	
10	not connected		
11	Input	Green	
12	not connected		
13		Red/Chroma GND	
14		fast switch GND	
15	Output	Red in/Chroma in	
16	Input	fast switch RGB/CVBS or Y	
17		CVBS GND	
18		fast switching GND	
19	Output	CVBS/Y/RGB sync	1 Vpp +/- 0.1 V into 75 Ohm (*)
20	Input	CVBS/Y	
21		Shield	

(*) for 100% white

2. Warnings and laser safety

2.1 Warning and laser safety

GB **WARNING**

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).
Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

ESD



NL **WAARSCHUWING**

Alle IC's en vele andere halfgeleiders zijn gevoelig voor elektrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

F **ATTENTION**

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise a leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller a ce que les composants ainsi que les outils que l'on utilise soient également a ce potentiel.

D **WARNUNG**

Alle IC und viele andere Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD).
Unsorgfältige Behandlung bei der Reparatur kann die Lebensdauer drastisch vermindern.
Sorgen sie dafür, das Sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

I **AVVERTIMENTO**

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevita potrebbe essere fortemente ridatta in caso di non osservazione della piu grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

GB

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

NL

Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt terug gebracht en dat onderdelen, identiek aan de gespecifieerde worden toegepast.

D

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten.
Der Originalzustand des Gerats darf nicht verandert werden.
Fur Reparaturen sind Original-Ersatzteile zu verwenden.

I

Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati pezzi di ricambiago idetici a quelli specificati.

F

Les normes de sécurité exigent que l'appareil soit remis a l'état d'origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.

SHOCK, FIRE HAZARD SERVICE TEST:

CAUTION: After servicing this appliance and prior to returning to customer, measure the resistance between either primary AC cord connector pins (with unit NOT connected to AC mains and its Power switch ON), and the face or Front Panel of product and controls and chassis bottom,
Any resistance measurement less than 1 Megohms should cause unit to be repaired or corrected before AC power is applied, and verified before return to user/customer.
Ref.UL Standard NO.1492.

NOTE ON SAFETY:

Symbol ⚠ : Fire or electrical shock hazard. Only original parts should be used to replace any part with symbol ⚠
Any other component substitution(other than original type), may increase risk or fire or electrical shock hazard.

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agrées, seuls habilités à réparer votre appareil en panne."

2.2 LASER SAFETY

This unit employs a laser. Only a qualified service person should remove the cover or attempt to service this device, due to possible eye injury.

LASER DEVICE UNIT

Type:	SemiconductorlaserGaAlAs
Wave length:	650 nm (DVD)
	780 nm (VCD/CD)
Output Power:	7 mW (DVD)
	10 mW (VCD/CD)
Beam divergence:	60 degree

CLASS 1
LASER PRODUCT

USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURE OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

AVOID DIRECT EXPOSURE TO BEAM

WARNING

The use of optical instruments with this product will increase eye hazard.
Repair handling should take place as much as possible with a disc loaded inside the player

WARNING LOCATION: INSIDE ON LASER COVERSHIELD

CAUTION VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM
ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING VED ÅBNING UNDGÅ UDSÆTTELSE FOR STRÅLING
ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN
VARNING SYNLIG OCH OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD BETRAKTA EJ STRÅLEN
VARO! AVATT AESSA OLET ALTTIINA NÄKYVÄLLE JA NÄKYMÄTTÖMÄLLE LASER SÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN
VORSICHT SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHL AUSSETSEN
DANGER VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID DIRECT EXPOSURE TO BEAM
ATTENTION RAYONNEMENT LASER VISIBLE ET INVISIBLE EN CAS D'OUVERTURE EXPOSITION DANGEREUSE AU FAISCEAU

Warning for powersupply on position (PH16)

The primary side of the powersupply including the heatsink carries live mains voltage when the player is connected to the mains even when the player is swiched off !
This primary area is not shielded so it is possible to touch copper tracks and/or components when servicing the player. Service personnel have to take precautions to prevent touching this area or components in this area .
The primary side of the powersupply has been indicated with a lightning stroke and a stripe-marked printed on the printed wiring board

Note:
The screws on the mechanism of the ASD1 module (position 001M in on the exploded view drawing) may never be touched removed or re-adjusted.
Handle the ASD1 module with care when the unit has to be exchanged!
The mechanism of the ASD1 module is very sensative for dropping or shocks.

3. Service hints, Taking the disc out

3.1 Service hints

3.1.1 Switched Mode Power Supply Unit PZ03

This power supply unit is not repairable and must be exchanged completely in case of failure. A new power supply can be ordered with codenumber QW12922150 (3104 129 22150).

3.1.2 SACD module

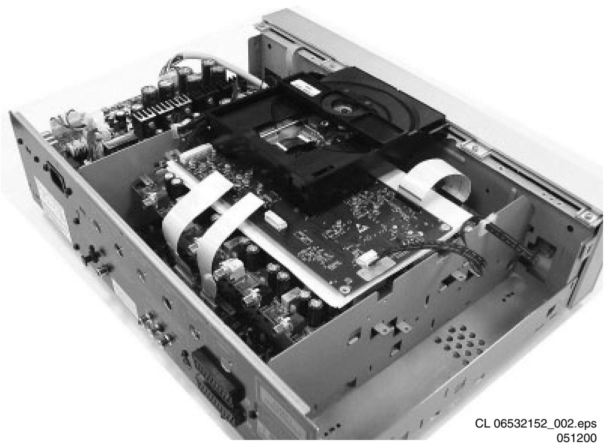
This module can be repaired as follows:
1. The loader and DVD-M(echanism) is one assembly (VAL6011) item 81. This assembly is a not repairable unit and must be exchanged completely in case of failure.
   A new unit can be ordered with codenumber QE02361104 (9305 023 61104).

2. The mono board has to be repaired down to component level. Repair handling of the monoboard requires a workshop with sophisticated desoldering tools.

3.1.3 Service positions

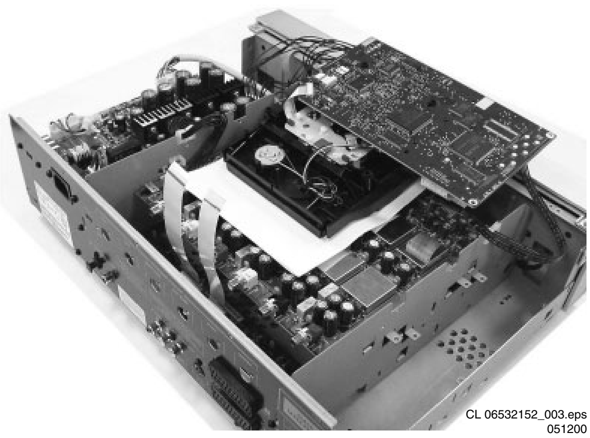
SACD module
See also dismantling instructions.
After demounting the DAC PCB PP16 and the dust bracket 023M, it is possible to connect the PC connection and to demount the SACD module to service the MONO PCB. After remounting the DAC PCB, the SACD module can be placed on top of the DAC PCB, protected by an insulation plate.

MONO PCB



CL 06532152_002.eps
051200

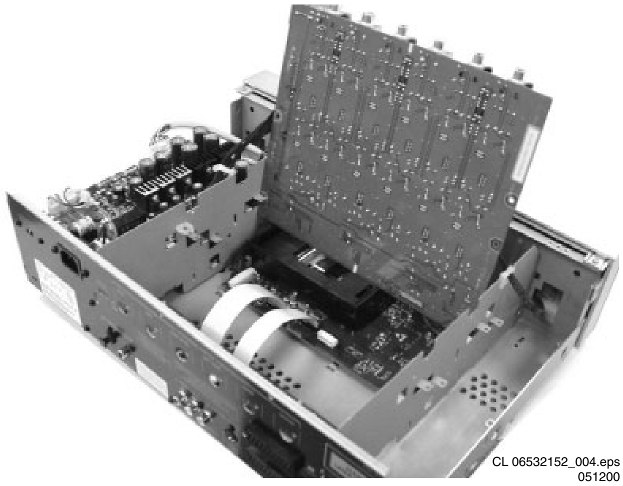
Figure 3-1



CL 06532152_003.eps
051200

Figure 3-2

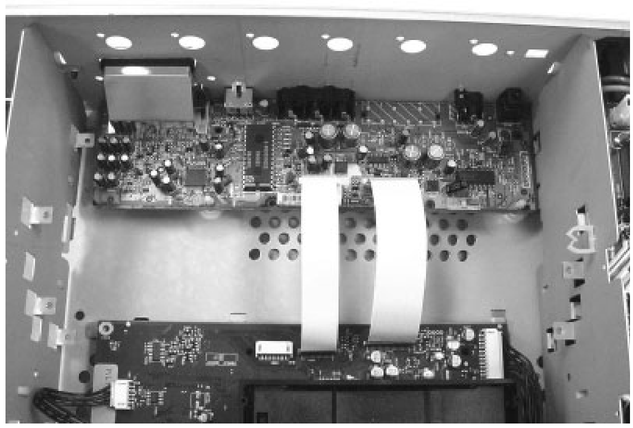
DAC PCB



CL 06532152_004.eps
051200

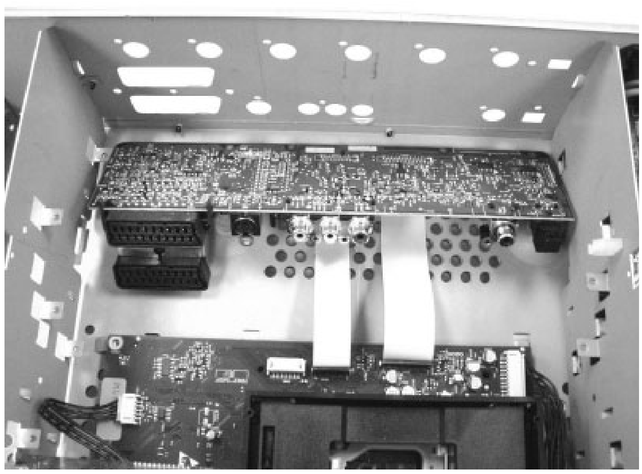
Figure 3-3

AV PCB



CL 06532152_005.eps
051200

Figure 3-4



CL 06532152_006.eps
051200

Figure 3-5

3.1.4. Mechanical- and dismantling instructions

DISMANTLING INSTRUCTIONS

See exploded view for item numbers

mounting ↑↓ demounting

Top cover
- ⇒ Remove 001D and Side cover 006D 005D x 8 at top 009D x 8 at both side

Front assy(001B+PY16+PY26)
- ⇒ open the tray and remove the tray front 046B
- ⇒ remove screws (front assy → frame 020M)
- ⇒ remove 2 screws 005G (front side Legs 004G)

Display board PY16
- ⇒ Remove 12 screws 5128 (board → front)
- ⇒ demount the board

ON/OFF BOARD PY26
- ⇒ remove screw 5128 (board → front)
- ⇒ demount the board

DAC PCB PP16
- ⇒ remove the connections to the DAC PCB
- ⇒ remove 4 screws 5128 on top of the PCB
- ⇒ demount the board

A/V board PN16
- ⇒ remove the flex connections to the mono board
- ⇒ remove screws (cinches → backplate
- ⇒ demount the board

Dust Bracket 023M
- ⇒ remove 4 screws 5110
- ⇒ demount the bracket

SACD MODULE (001M + PZ01)
- ⇒ Remove the connections to the monoboard
- ⇒ Remove 4 screws (dust cover on loader 001M)
- ⇒ Remove dust cover.
- ⇒ Open the tray. If electrically not possible, see the instruction below.
- ⇒ Remove 4 screws (loader 001M frame 020M)
- ⇒ Demount the module

SACD Mono board PZ01
- ⇒ Remove the flex connections to the turntabel motor and the sledge motor.
- ⇒ Remove 4 screws 5128 (mono board PZ01 → loader 001M)
- ⇒ Remove carefully the flex connection to the OPU and the wire connection to tray motor.
- ⇒ Demount the board

Loader VAL6011/04 : 001M
- ⇒ Is a non repairable unit

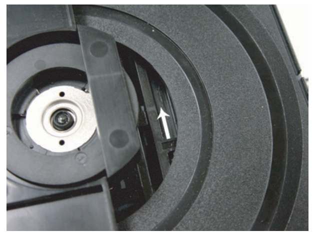
Linear power supply PH16
- ⇒ Remove the connections
- ⇒ Remove 2 screws 5128 (board → frame)
- ⇒ Remove 2 screws 5128 (mains inled → backplate)
- ⇒ Remove 2 screws 5128 (voltage selector → backplate)
- ⇒ Release the snaps of 2 spacers 012G(board → frame)
- ⇒ Demount the board

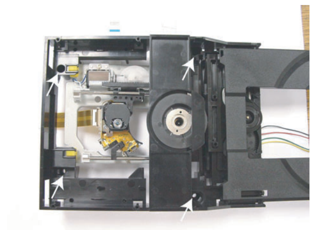
Switched mode power supply unit PZ03
- ⇒ Remove the connections
- ⇒ Remove 5 screws (board → bottom plate) 5110 x 3 and 5128 x 2
- ⇒ Demount the board

Transformer L001
- ⇒ Remove 4 screws 5129 x 2 and 5126 x 2 (trafo → bottom plate)
- ⇒ Demount the transformer

Manually opening of tray
When it is not possible to open the tray with the open/ close button, the tray can manually be opened.
When no disc is loaded, unlock the tray by moving the slide from the left to the right and pull tray outwards.

Remove 4 screws to remove loader.

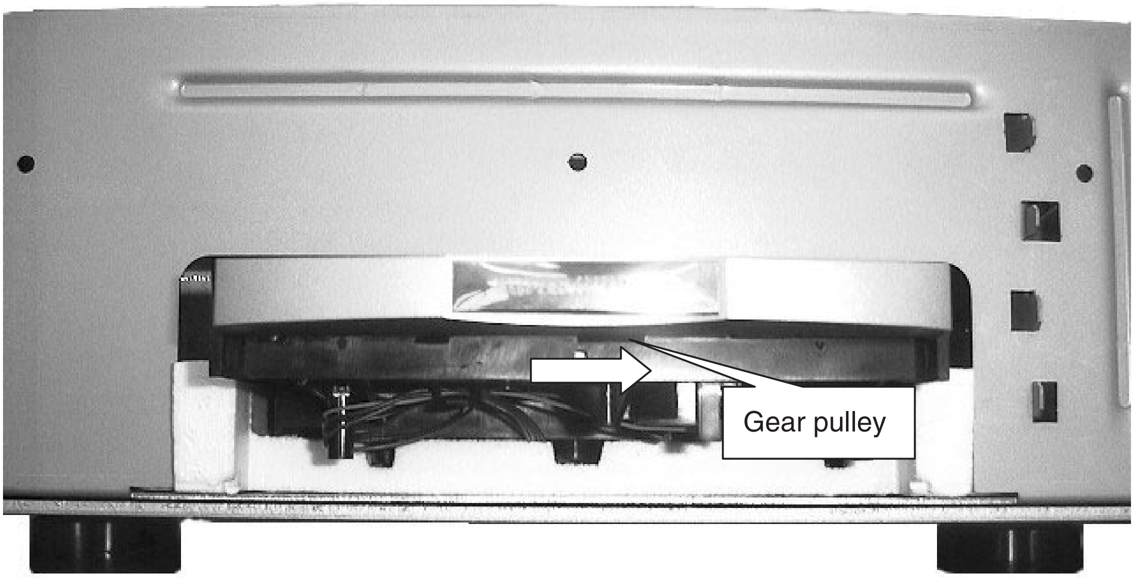




3.2 Taking the disc out.

1. Remove the top cover with 8 screws.
2. Remove the both side covers with 8 screws.
3. Remove the 8 screws of front panel and unfasten 2 screws of front legs.
4. Pull out the front panel.
5. Turn right the pulley by your finger or nail. (See fig.1)
6. Then the tray is moved a little. Pull the tray with your hand at this time.

Note: Take care of unhurt gear belt.



4. Installing the software and entering version.

The kind of CD-ROM (software), and explanation

a) Key reassignment Disc (44444444.016) **[Parts No. *SA12KEYCD]**
b) Background (PAL) Disc (11111111.008) **[Parts No. *SA12PALCD]**
c) Background (NTSC) Disc (22222222.008) **[Parts No. *SA12NTSCD]**

Installing necessary CD-ROM for version.

For /N: Key reassignment Disc (44444444.016) and Background (PAL) Disc (11111111.008)
For /S: Key reassignment Disc (44444444.016) and Background (PAL) Disc (11111111.008)
For /U: Key reassignment Disc (44444444.016) and Background (NTSC) Disc (22222222.008)
For /F: Key reassignment Disc (44444444.016) and Background (NTSC) Disc (22222222.008)

How to installing the software
All software is installed from CD-ROM. These are supplied by another disc, respectively. When disc was put in the player, software is installed automatically. And disc comes out of the player, after finished. The sequence to install is “Key reassignment” first and, next, is “Background”.

Entering Version and region code

Caution: This information is confidential and may not be distributed. Only a qualified service person should reprogram the mono board.

Reprogramming is limited to 25 times.
When the counter reaches 25, reprogramming is not possible anymore and the region code change counter must be reset by means of the Diagnostic Software.
Reprogramming will be done by way of the remote control.
Put the player in stop mode, no disc loaded.
Press the following keys on the remote control.
<PLAY> followed by numerical keys <2>, <7>, <4>
The display shows “-----------“
Press now successively the following keys
For /N: <0>, <0>, <1>, <0>, <0>, <0>, <0>, <0>, <0>, <0>, <0>
For /U: <0>, <0>, <2>, <0>, <0>, <0>, <0>, <0>, <0>, <0>, <0>
For /S: <0>, <0>, <3>, <0>, <0>, <0>, <0>, <0>, <0>, <0>, <0>
For /F: <0>, <0>, <4>, <0>, <0>, <0>, <0>, <0>, <0>, <0>, <0>
Press <PLAY> again.
The TV screen will become blue during a short time to confirm that the digital board has been reprogrammed.

How to confirm the software and the version.

11111111.008/ 22222222.008: Displayed on TV screen as background of marantz is OK, after entering version.
If a power supply is turned on, with <STOP> and <NEXT> of a player pushed, a change of NTSC mode and PAL mode can be performed.
44444444.016: Worked <DISPLAY OFF> or <VIDEO OFF> of the player is OK, After entered version.
Version: Looked at “Audio language” or “Subtitle language” in “Personal preferences”.
The contents of “Audio language” or “Subtitle language” are as the following table.

/N	/U	/S	/F
English	English	English	Japanese
Español	Español	Español	English
Français	Français	Français	Español
Português	Português	Português	Français
Italiano	Italiano	Russian	Português
Deutsch	Russian	Japanese	Russian
Nederlands	Deutsch	Korean	Korean
Suomeksi	Greek	Chinese	Chinese
Dansk	Japanese	Bahamas Indonesia	Bahamas Indonesia
Norsk	Korean	Khmer	Khmer
Svenska	Chines	Bahamas Malayalam	Bahamas Malayalam
Russian	Quechua	Burmese	Burmese
Greek	Guarani	Nepal	Nepal
Tϋrkçe	Aymara	Thai	Thai
Íslensk	Inupiaq	Vietnamese	Vietnamese
Català		Tibetan	Tibetan

Default setting

Reset of Personal preferences

Turned on power of the player, while depressing <PLAY> and <OPEN/CLOSE> button, reset of personal preferences can be performed.

Setting of menu

	TV mode	Black level shift	Remote control code
/N	PAL	ON	DVD1
/U	NTSC	ON	DVD1
/S	PAL	OFF	DVD1
/F	NTSC	OFF	DVD1

Black level shift is in “PICTURE” of “Personal Preferences”. It becomes ON if it resets.
How to change a remote control code is as follows. (CODE DVD1/ CODE DVD2)

By remote controller: Press <DISPLAY> and <1> become code DVD1.
Press <DISPLAY> and <2> become code DVD2.

By player: Turned on power of the player, while depressing <SOUND MODE> and <OPEN/CLOSE> button.

Position of switches

	Voltage Selector (SH02)	Filter (SD71)	RC-6 (SF51)
/N	230V	Position 1	Internal
/U	115V	Position 1	Internal
/S	230V	Position 1	Internal
/F	115V	Position 1	Internal

5. Diagnostic software, trouble shooting and test instructions

Due to the complexity of the SACD player, the time to find a defect in the player can become long. To reduce this time, the player has been equipped with Diagnostic and Service software (DS). The DS offers functionality to diagnose the SA-12S1 player hardware and tests the following:

- Interconnections between components
- Accessibility of components
- Functionality of the audio and video paths

This functionality can be accessed via several interfaces:

1. End user/Dealer script interface
2. Player script interface
3. Menu and command interface

5.1 END USER/DEALER SCRIPT INTERFACE

5.1.1 Description

The End user/Dealer script interface gives a diagnosis on a stand alone SACD player; no other equipment is needed. During this mode, a number of hardware tests (nuclei) are automatically executed to check if the player is faulty. The diagnosis is simply a "fail" or "pass" message. If the message "FAIL" appears on the display, there is apparently a failure in the player. If the message "PASS" appears, the nuclei in this mode have been executed successfully. There can be still a failure in the player because the nuclei in this mode don't cover the complete functionality of the player.

5.1.2 Contents

The End use/Dealer script executes all diagnostic nuclei that do not need any user interaction and are meaningful on a standalone SACD player. The nuclei called in the End user/ Dealer script are the following:

Display Count-down	Nucleus number	Nucleus name
7	104	Host Decoder SDRAM Write Read
6	123	Host Decoder I2C NVRAM
5	500	Front Panel Echo
4	601	Basic Engine Echo
3	1200	Furore SDRAM Low Write Read
2	1201	Furore SDRAM High Write Read
1	1300	DAC Board I2C Test

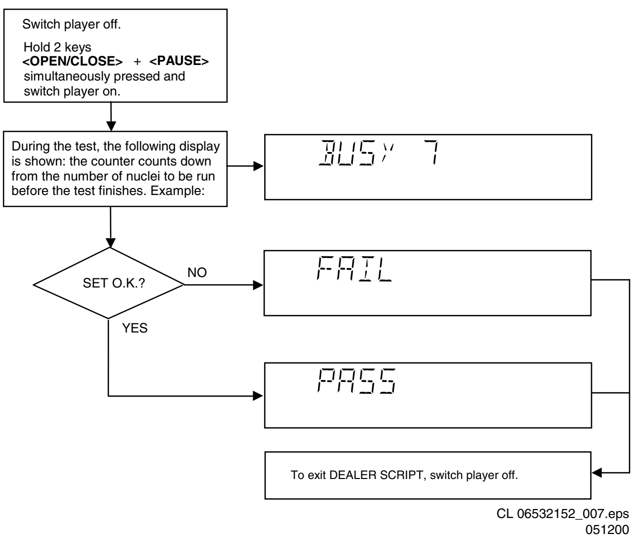


Figure 5-1

5.2 PLAYER SCRIPT INTERFACE

5.2.1 Description

The Player script will give the opportunity to perform a test that will determine which of the SACD player's modules are faulty, to read the error log and to perform an endurance loop test. To successfully perform the tests, the SACD player must be connected to a TV set, a multi-channel amplifier, a set of 6 boxes and an external video source to check the output of a number of nuclei.

To be able to check results of certain nuclei, the player script expects some interaction of the user (i.e. to approve a test picture or a test sound). Some nuclei (e.g. nuclei that test functionality of the Basic Engine module) require that the SACD player itself is opened, to enable the user to observe moving parts and approve their movement visually.

Only tests within the scope of the diagnostic software will be executed hence only faults within this scope can be detected.

5.2.2 Structure of the Player Script

The player script consists of a set of nuclei testing the hardware modules in the SACD player: the Display PWB, the Digital PWB, the Basic Engine, the DAC PWB and the AV PWB.

Nuclei run by the player test need some user interaction; in the next table this interaction is described. The player test is done in two phases:

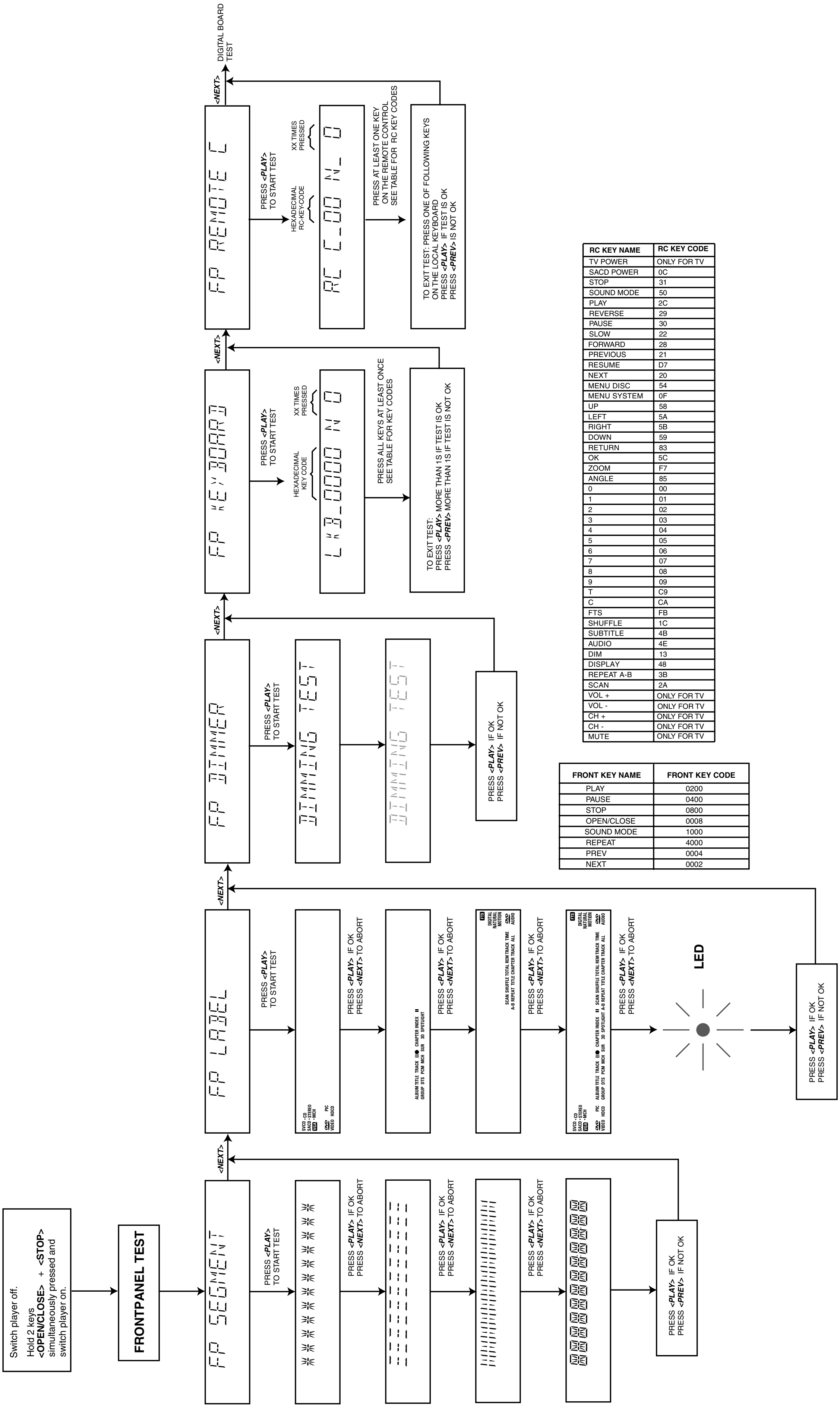
Interactive tests: this part of the player test depends strongly on user interaction and input to determine nucleus results and to progress through the full test.

Reading the error log information can be useful to determine any errors that occurred recently during normal operation of the DVD player.

The loop test will perform the same nuclei as the dealer test, but it will loop through the list of nuclei indefinitely.

Step	Description	Executing nucleus
1	Press OPEN/CLOSE and STOP, and turn on the player.	2
2	Display shows "FP SEGMENT". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 7.	502
3	Starbursts are visible. Press PLAY.	502
4	Horizontal bars are visible. Press PLAY.	502
5	Vertical bars are visible. Press PLAY.	502
6	All segments are visible. Press PLAY.	502
7	Display shows "FP LABEL". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 13.	503
8	Labels of the first grid are visible. Press PLAY.	503
9	Labels of the second grid are visible. Press PLAY.	503
10	Labels of the third grid are visible. Press PLAY.	503
11	All labels are visible. Press PLAY.	503
12	Standby LED is on. Press PLAY.	503
13	Display shows "FP DIMMER". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 15.	518
14	Display shows "DIMMING TEST". Wait until it is dimmed, and press than PLAY.	518
15	Display shows "FP KEYBOARD". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 17.	505
16	Display shows "LKB_0000 N 0". Press all keys at least one time. Press PLAY for a least one-second to exit this nucleus.	505
17	Display shows "FP REMOTE C". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 19.	506
18	Display shows "RC C_ N_ 0". Press at least one key of the remote control. Press PLAY to exit this nucleus.	506
19	Display shows "SCART-SW DVD". Press PLAY to execute this nucleus. Otherwise press NEXT.	1408
20	Display shows "COLOUR SETUP". Press PLAY to execute this nucleus. Otherwise press NEXT.	1406
21	Display shows "COLOUR-B ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	120
22	Display shows "PINKNOISE ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	115
23	Display shows "COLOUR-B OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	121
24	Display shows "PINKNOIS OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	116
25	Display shows "SINE ON". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 27.	117
26	Display shows "BUSY". To stop this nucleus, press STOP.	117
27	Display shows "SCART-S PASS". Press PLAY to execute this nucleus. Otherwise press NEXT.	1409
28	Display shows "BE RESET". Press PLAY to execute this nucleus. Otherwise press NEXT.	603
29	Display shows "BE VERSION". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 31.	602
30	Display shows the version of the basic engine. To stop this nucleus, press PLAY.	602
31	Display shows "BE TRAY OPEN". Press PLAY to execute this nucleus. Otherwise press NEXT.	616
32	Display shows "BE TRAY CLOSE". Press PLAY to execute this nucleus. Otherwise press NEXT.	615
33	Display shows "BE DVD LASER". Press PLAY to execute this nucleus. Otherwise press NEXT.	635
34	Display shows "BE CD LASER". Press PLAY to execute this nucleus. Otherwise press NEXT.	636
35	Display shows "BE LASER OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	637
36	Display shows "BE FOCUS ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	604
37	Display shows "BE FOCUS OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	605
38	Display shows "BE DISCM ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	606
39	Display shows "BE DISCM OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	607
40	Display shows "BE RADIAL ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	608
41	Display shows "BE RADIAL OF". Press PLAY to execute this nucleus. Otherwise press NEXT.	609
42	Display shows "BE SLEDG OUT". Press PLAY to execute this nucleus. Otherwise press NEXT.	611
43	Display shows "BE SLEDGE IN". Press PLAY to execute this nucleus. Otherwise press NEXT.	610
44	Display shows "BE GROOVE IN". Press PLAY to execute this nucleus. Otherwise press NEXT.	612
45	Display shows "BE GROOV MID". Press PLAY to execute this nucleus. Otherwise press NEXT.	613
46	Display shows "BE GROOV OUT". Press PLAY to execute this nucleus. Otherwise press NEXT.	614
47	Display shows "BE RESET". Press PLAY to execute this nucleus. Otherwise press NEXT.	603
48	Display shows "BE TRAY OPEN". Press PLAY to execute this nucleus. Otherwise press NEXT.	616
49	Display shows "BE TRAY CLOSE". Press PLAY to execute this nucleus. Otherwise press NEXT.	615
50	Display shows "ERRORLOG". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 52.	404
51	Display shows the error codes. With the keys NEXT and PREV it is possible to step through the error codes. To stop this nucleus, press STOP.	404
52	Display shows "PASS", this means the Player Script is finished and the execution of the User Dealer Script is started in an endless loop. The execution of the User Dealer Script will only stop, when an error occurs. The Display shows the error code.	1

Remark
In case of failure, the display shows " FAIL 00000 ". The description of the shown error code can be retrieved in the survey of Nuclei Error Codes (paragraph 5.4). Once an error occurs, it is not possible to continue the player script. Switch off the set and restart the player script. By pressing the NEXT key, it is possible to jump over the failure and to continue the player script.



RC KEY NAME	RC KEY CODE
TV POWER	ONLY FOR TV
SACD POWER	0C
STOP	31
SOUND MODE	50
PLAY	2C
REVERSE	29
PAUSE	30
SLOW	22
FORWARD	28
PREVIOUS	21
RESUME	D7
NEXT	20
MENU DISC	54
MENU SYSTEM	0F
UP	58
LEFT	5A
RIGHT	5B
DOWN	59
RETURN	83
OK	5C
ZOOM	F7
ANGLE	85
0	00
1	01
2	02
3	03
4	04
5	05
6	06
7	07
8	08
9	09
T	C9
C	CA
FTS	FB
SHUFFLE	1C
SUBTITLE	4B
AUDIO	4E
DIM	13
DISPLAY	48
REPEAT A-B	3B
SCAN	2A
VOL +	ONLY FOR TV
VOL -	ONLY FOR TV
CH +	ONLY FOR TV
CH -	ONLY FOR TV
MUTE	ONLY FOR TV

FRONT KEY NAME	FRONT KEY CODE
PLAY	0200
PAUSE	0400
STOP	0800
OPEN/CLOSE	0008
SOUND MODE	1000
REPEAT	4000
PREV	0004
NEXT	0002

Figure 5-2

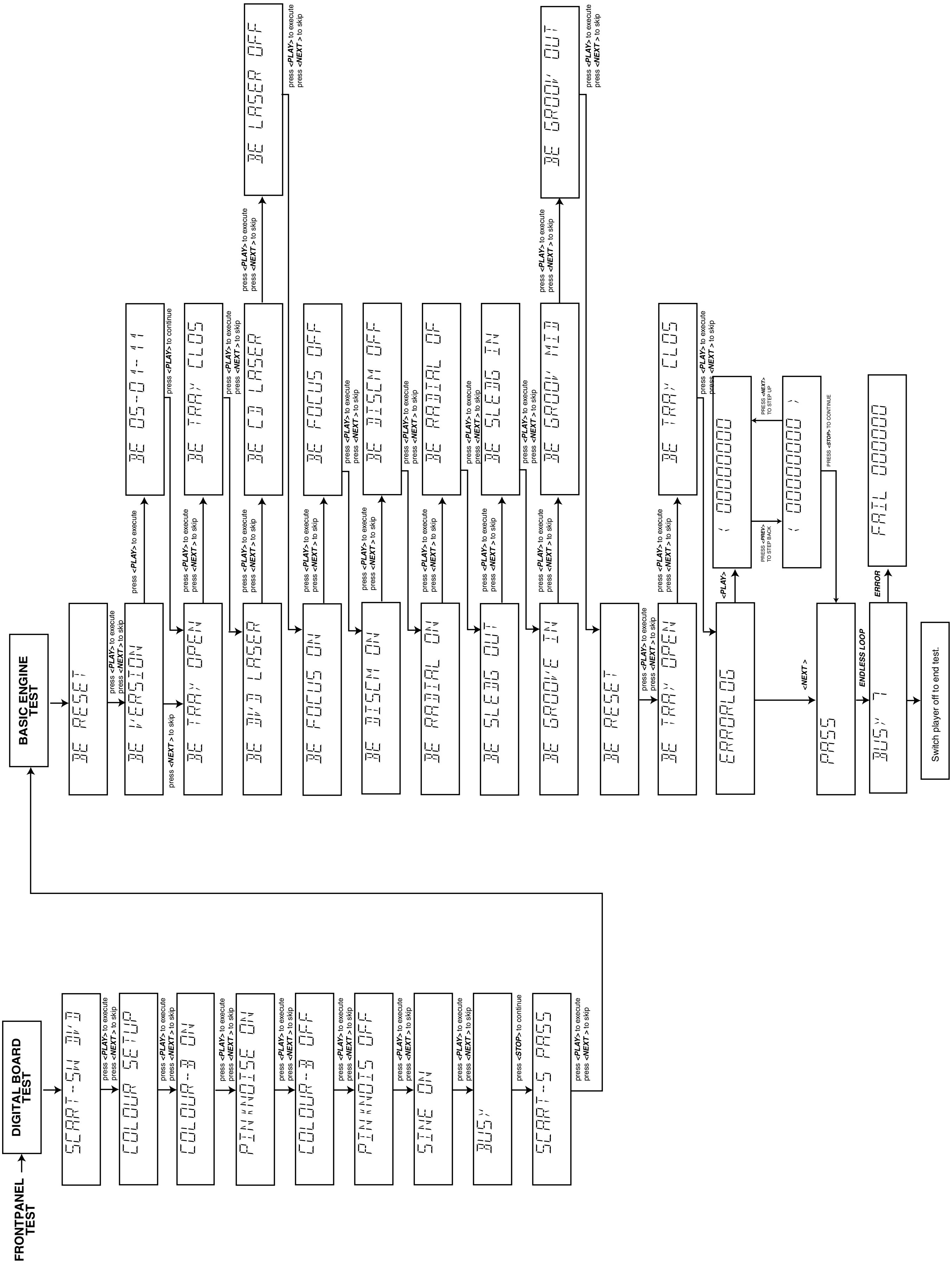

FRONTPANEL TEST
DIGITAL BOARD TEST
SCART-SW DVD
COLOUR SETUP
COLOUR-B ON
PIN*NOISE ON
COLOUR-B OFF
PIN*NOIS OFF
SINE ON
BUSY
SCART-S PASS
press <PLAY> to execute
press <NEXT> to skip
press <STOP> to continue
BASIC ENGINE TEST
BE RESET
BE VERSION
BE 05-01-11
press <PLAY> to continue
BE TRAY OPEN
BE TRAY CLOS
BE DVD LASER
BE CD LASER
BE LASER OFF
BE FOCUS ON
BE FOCUS OFF
BE DISCM ON
BE DISCM OFF
BE RADIAL ON
BE RADIAL OF
BE SLEDG OUT
BE SLEDG IN
BE GROOVE IN
BE GROOV MID
BE GROOV OUT
ERRORLOG
<PLAY>
PRESS <PREV> TO STEP BACK
PRESS <NEXT> TO STEP UP
PRESS <STOP> TO CONTINUE
<NEXT>
PASS
ENDLESS LOOP
BUSY 7
ERROR
FAIL 000000
Switch player off to end test.

Figure 5-3

5.2.3 Errorlog

Explanation:
The application errors will be logged in the NVRAM. The maximum number of error bytes that will be visible is 16. The first word (4 digits) of the byte is the component identification; the last word is the error code.
The diagnostics software will present a combination of this component identification plus an error code on the local display (and on the attached terminal). The last reported error is shown as < 00000000, the oldest visible error as 00000000> and the errors in between as < 00000000 >.
The devices that may report errors are the serial controller (UART), the basic engine (BE), the slave processor (SLPH), the SACD Stream Manager (SSM) and the SACD Media Access (SMA). The identification of these components is as follows:

Component name	Component identification
Serial controller (UART)	000A
Engine (BE)	0016
Slave Processor (SLPH)	001A
SACD Stream Manager (SSM)	001C
SACD Media Access (SMA)	002E
Diagnostic software (DS)	Dxxx

The tables in the next chapters list the error code and corresponding problem. The column 'Explanation' holds a more elaborate description and the most likely reason for the error.

Some examples:
002E0000 (SMA reported a timeout error
0016010A (Engine could not fully close or open the tray
D0010001 (Flash checksum failed (for other DS errors, see description of nucleui error codes in paragraph 5.4.

UART error codes

Error Number	Error name	Explanation
0000	BUF_OVERFLOW	To many characters were offered in too little time. Reason: system was too busy doing other jobs.
0001	COMMU-NICATION	Usually a protocol error. Reason: bad connection between engine and processor.

BE errors

Error Number	Error name	Explanation
0101	S2B_ILL_COMMAND	Parameter(s) not valid for this command. Reason: some communication problem between UART and engine.
0102	S2B_ILL_PARAM	Command not allowed in this state or unknown. Reason: see S2B_ILL_COMMAND error
0103	S2B_SLEDGE	Sledge could not be moved to home position.
0104	S2B_FOCUS	Focus failure
0105	S2B_MOTOR	Motor could not reach speed within timeout
0106	S2B_RADIAL	Servo didn't get on track after several retries.
0107	S2B_PLL_LOCK	PLL could not lock in Accessing or Tracking state
0108	SBC_HEADER_TO	Header timeout
0109	S2B_SBC_NOT_FOUND	Requested subcode item could not be found.
010A	S2B_TRAY	Tray could not be opened or closed completely.
010B	S2B_TOC_READ	TOC could not be read within timeout period.
010C	S2B_JUMP	Requested seek could not be performed.
010D	S2B_NON_EXIST_SES	Attempt to access a non-existing session.
010E	S2B_NON_EXIST_BCA	
01F0	S2B_OVERRUN	Too many bytes received over S2B Reas on: see S2B_ILL_COMMAND error
01F1	S2B_COMM_TO	Not enough bytes are received over S2B Reason: see S2B_ILL_COMMAND error
01F2	S2B_PARITY	Byte received with parity error. Reason: see S2B_ILL_COMMAND error
01F3	S2B_ILL_PHASE	CMD IDC is not valid, transmission out of sync. Reason: see S2B_ILL_COMMAND error
01F4	S2B_ILL_NR_OF_BYTES	Byte count has an illegal value. Reason: see S2B_ILL_COMMAND error

SLPH error codes

Error Number	Error name	Explanation
0000	COMMUNI-CATION	Error in I2C communication. Reason: bad connection between slave processor and main processor.

SSM error codes

Error Code	Error name	Explanation
0006	SP_SYNCERROR	System cannot get synchronised with sectors coming from disc. Reason: Usually a damaged disc or the player was dropped/ pushed during operation. If not, the engine is malfunctioning.
0007	SP_EDCERROR	Data coming from disc is damaged. Reason: see SP_SYNCERROR
0008	SP_CONTINUITYERROR	Sequence of sectors coming from disc is incorrect. Reason: see SP_SYNCERROR
0009	DMX_CONTINUITYER-ROR	Sequence of sectors is incorrect. Reason: problem with buffer RAM
000A	LLD_ERROR	An illegal audio format was offered to the decoder. Reason: unknown audio type on disc or problem with buffer RAM
000B	BCU_ERROR	Internal problem in Furore chip

SMA error codes

Error Number	Error name	Explanation
0000	SMA_TIMEOUTERROR	Data coming from disc not in time. Reason: damaged disc or engine problem.

5.2.4 Reprogramming of region code

Caution

This information is confidential and may not be distributed. Only a qualified service person should reprogram the mono board.

After repair of the mono board, all the customer settings and also the region code might be lost (P0).
Reprogramming of the mono board will put the player back in the state in which it has left the factory, i.e. with the default settings and the allowed region code.

Reprogramming is limited to 25 times.
When the counter reaches 25, reprogramming is not possible anymore and the region code change counter must be reset by means of the Diagnostic Software.

Reprogramming will be done by way of the remote control.
Put the player in stop mode, no disc loaded.
Press the following keys on the remote control:
<PLAY> followed by numerical keys ***<2> <7> <4>***
The display shows: "**- - - - - - - - - - -**"
Press now successively the following keys :
for /N(P1): ***<0><0><1> <0><0><0><0><0><0><0><0><0>***
for /U(P2): ***<0><0><2> <0><0><0><0><0><0><0><0><0>***
for /S(P3): ***<0><0><3> <0><0><0><0><0><0><0><0><0>***
for /F(P4): ***<0><0><4> <0><0><0><0><0><0><0><0><0>***

Press ***<PLAY>*** again.
The TV screen will become BLUE during a short time to confirm that the digital board has been reprogrammed.

Figure 5-4

5.2.5 Trade mode

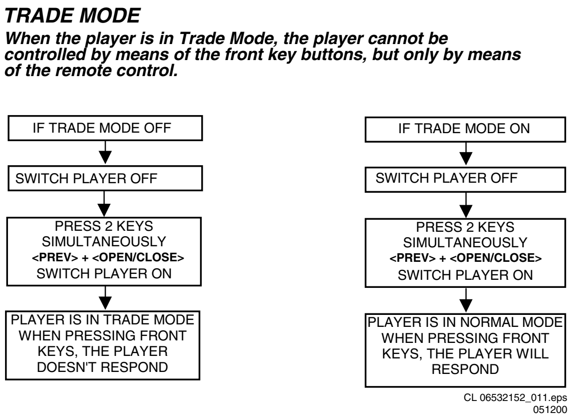


Figure 5-5

5.3 MENU AND COMMAND MODE INTERFACE

5.3.1 NUCLEI NUMERATION

Each nucleus has a unique number of four digits. This number is the input of the command mode.

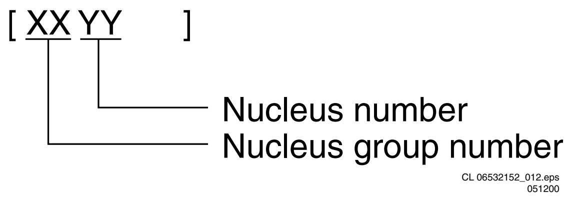


Figure 5-6

The following groups are defined:

Group number	Group name
0	Basic / Scripts
1	Host decoder (Sti5505 and memory)
2	Audio / video encoder (DVDR only)
3	VSM (DVDR only)
4	NVRAM
5	Front Panel
6	Basic Engine
7	Analogue board (DVDR only)
8	DVIO (DVDR only)
9	Loop nuclei (DVDR only)
10	Library sub nuclei (I2C nuclei)
11	User interface
12	Furore (SACD only)
13	DAC (SACD only)
14	Miscellaneous

5.3.2 ERROR HANDLING

Each nucleus returns an error code. This code contains six numerals, which means:

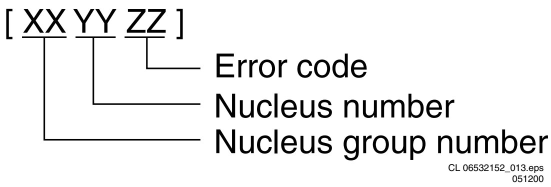


Figure 5-7

The nucleus group numbers and nucleus numbers are the same as above.

5.3.3 COMMAND MODE INTERFACE

Set-up physical interface components
Hardware required:

- Service PC
- one free COM port on the Service PC
- special cable to connect DVD player to Service PC

The service PC must have a terminal emulation program (e.g. OS2 WarpTerminal or Procomm) installed and must have a free COM port (e.g. COM1). Activate the terminal emulation program and check that the port settings for the free COM port are: 19200 bps, 8 data bits, no parity, 1 stop bit and no flow control. The free COM port must be connected via a special cable to the RS232 port of the DVD player. This special cable will also connect the test pin, which is available on the connector, to ground (i.e. activate test pin).
Code number of PC interface cable: 3122 785 90017

Activation
Switch the player on and the following text will appear on the screen of the terminal (program):

```
SACD1000 Diagnostic Software version 0.11
SDRAM Interconnection test passed
Basic SDRAM test passed

(M) enu, (C) ommand or (S) 2B-interface?     [M] : @ C ↵
DD:>
```

CL 06532152_014.eps
051200

Figure 5-8

The first line indicates that the Diagnostic software has been activated and contains the version number. The next lines are the successful result of the SDRAM interconnection test and the basic SDRAM test. The last line allows the user to choose between the three possible interface forms. If pressing C has made a choice for Command Interface, the prompt (“DD>”) will appear. The diagnostic software is now ready to receive commands. The commands that can be given are the numbers of the nuclei.

Command overview
The tables below give an overview of the commands.

Startup

[xx yy] Number	Nuclei
startup	Test the UART of the host decoder by sending a string to the UART.

Host Decoder Tests [01]

[xx yy] Number	Nuclei
100	Checksum Flash Checks the FLASH checksum.
101	Flash Write Access 1 Checks whether the first FLASH can be written. Check if Write enable pin of flash is high. The set must be switched off to restart DSW.
102	Flash Write Access 2 Checks whether the second FLASH can be written. Check if Write enable pin of flash is high. The set must be switched off to restart DSW.
103	Flash Write Read Checks whether we can write to the FLASH. This test is non-destructive. However, this test should be used with great caution. Potential danger exists when power loss occurs when the test is being executed. The contents of the NVRAM are changed during the test and are restored after the test. However, power loss may occur before the original contents are restored. Therefore, this test is not included in scripts. Check if Write enable pin of flash is high. The set must be switched off to restart DSW.
104	SdRam Write Read The following three individual memory tests will be executed: a data bus test, an address bus test, and a device test. The first two test for electrical wiring problems and improperly inserted chips, while the third is intended to detect missing chips and catastrophic failures. As an unintended consequence, the device test will also uncover problems with the control bus wiring.
105	SdRam Write Read Fast The following two individual memory tests will be executed: a data bus test, and an address bus test. The two test for electrical wiring problems and improperly inserted chips.
106	Dram Write Read The following three individual memory tests will be executed: a data bus test, an address bus test, and a device test. The first two test for electrical wiring problems and improperly inserted chips, while the third is intended to detect missing chips and catastrophic failures. As an unintended consequence, the device test will also uncover problems with the control bus wiring. Because the DRAM is not mounted in commercial sets, this test will result in a failure.
107	Dram Write Read Fast The following two individual memory tests will be executed: a data bus test, and an address bus test. The two test for electrical wiring problems and improperly inserted chips. Because the DRAM is not mounted in commercial sets, this test will result in a failure.
108	Version Displays the version number of the Sti5505.
109	Mute On Switches the audio mute of the monoboard on.
110	Mute Off Switches the audio mute of the monoboard off.
111	De-Emphasis On Switches the audio de-emphasis filter in the Sti5505 on.
112	De-Emphasis Off Switches the audio de-emphasis filter in the Sti5505 off.
113	Centre-On-Stereo Pin On Sets the PIO-pin Centre_on_stereo to '1'.
114	Centre-On-Stereo Pin Off Sets the PIO-pin Centre_on_stereo to '0'.

[xx yy] Number	Nuclei
115	Pink Noise On Generates internally on the Sti5505 a pink noise audio signal that will be passed to all the DACs were it is converted to an analogue audio signal.
116	Pink Noise Off Switches off the pink noise audio signal generated with DS_HostdPinkNoiseOn.
117	Sine On Generates a sine signal of 1 kHz on the analogue output. The sine signal digital data are stored in the audio buffer in SDRAM, passed through the audio decoder and without any further processing to the audio DAC were it is converted to an analogue audio signal. To stop the sine, press the STOP key on the local keyboard.
118	Sine Burst 1kHz Generates a sine signal of 1 kHz on the analogue output that lasts about four seconds. The generation of the signal is the same as in DS_HostdSineOn.
119	Sine Burst 12kHz Generates a sine signal of 12kHz on the analogue output that lasts about four seconds. The generation of the signal is the same as in DS_HostdSineOn.
120	Colour-bar On Enables colour bar in the DENC in the Sti5505. To make the colourbar visible on the TV screen via the SCART output, the following commands must also be given: 1406: Colour Setup Normal 1408: Scart Switch DVD
121	Colour-bar Off Disables colour bar in the DENC in the Sti5505.
122	NvramWrR Checks the NVRAM by writing and reading patterns to and from all locations. This test is non-destructive. However, this test should be used with great caution. Potential danger exists when power loss occurs when the test is being executed. The contents of the NVRAM are changed during the test and are restored after the test. However, power loss may occur before the original contents are restored. Therefore, this test is not used in script and menu mode.
123	NvramI2c Checks the interconnection between the I2C controller on the STi5505 and the NVRAM.
124 125 126 127 128 129	Pink Noise On Channel X Generates internally on the Sti5505 a pink noise audio signal that will be passed to the DACs on the DAC board where it is converted to an analogue audio signal. Only one channel at the time will generate a pink noise audio signal. X indicates a channel number. It can be turned off with the nucleus 116. 124 = ch1, ... ,29 = ch6

NVRAM Tests [04]

[xx yy] Number	Nuclei
400	Resets the NVRAM. After the reset of the NVRAM, nucleus 404 will give error 40402: "NVRAM error log is invalid". Introducing an error can rectify this. (E.g. playing a disc upside down). To reset the error log, it is recommended to use nucleus 407.
404	Line1 Error Log Reads the error log from NVRAM. The information is displayed on the local display and is send to the serial port. With the PREV and NEXT key it is possible to step through the logging information on the local display. The STOP key is used to exit this nucleus at any time.
405	Line1 Lifetime Log Ends the lifetime log. The information is displayed on the local display and is send to the serial port. The following statistics will be read from the NVRAM: Power On Time. The time in hours that the SACD player was turned on. Playing Time CDDA and VCD. The time in hours that the disc has been spinning summed up for both playing CDDA and VCD discs. Playing Time DVD. Like above but for DVD discs. Times Tray Open. The total number of times the tray has been opened. With the PREV and NEXT key it is possible to step through the logging information on the local display. The STOP key is used to exit this nucleus at any time.
406	Line1 Application Version Reads the version of the application software from a fixed location in the NVRAM.
407	Line2 Error Log Reset Resets the error log.
408	Line2 Lifetime Log Reset Resets the lifetime log.
409	Line2 Region-Code Reset Resets the region code change counter of the SACD player.

Front Panel Tests [05]

[xx yy] Number	Nuclei
500	Echo Checks the interface between the SACD Monoboard and the slave processor on the front panel by sending an 'echo' command. The I2C connection will be tested.
501	Version Returns the ROM software version and internal ID of the slave processor of the front panel.
502	Segment Checks the local display by lighting four test patterns. The following test patterns are: Show a starburst Light all horizontal segments Light all vertical segments Light all segments User confirmation is necessary after each test pattern.
503	Label Checks the local display and LED of the front panel by lighting all labels and LED in five steps: Light the first label grid. Light the second label grid. Light the third label grid. Light all label grids. Light the LED. User confirmation is necessary after each test pattern.
504	Led Switches the LED on. User confirmation is necessary.
505	Keyboard Checks the local keyboard. The local display gives feedback on the keys that are pressed by showing their code: [LKB_xxxx N_yy]. [xxxx] Means the key-code and is hexadecimal. [yy] means the number of times this key was pressed. All keys must be tested. User confirmation is necessary at the end of the test. However, the PLAY, PREV and NEXT keys are also part of the keyboard test itself. Therefore it is needed to press these keys for one second.
506	Remote-Control Checks the interface between the remote control and the front panel. The local display gives feedback on the remote key that is pressed by showing its code: [RC C_xx N_yy]. [xx] Means the RC-key-code and is hexadecimal. [yy] means the number of times a RC-key was pressed. At least one key must be tested. User confirmation is necessary. The PLAY key confirms that at least one RC-key is tested.
518	Dimmer Dimming test of Display

User confirmation is necessary during the front panel tests. The following keys are used for user feedback:

PLAY for confirming that the test is correct. PREV when the test is not ok. NEXT is pressed in order to abort to the nucleus at any time; the nucleus is not tested successfully. The confirmation can also be send through the serial port for automated verification. Character ‘o’ means 'ok'; character ‘n' means that this nucleus must be aborted; the nucleus is not tested successfully. Any other key will fail the test.

Basic Engine Tests [06]

[xx yy] Number	Nuclei
600	S2B Pass Switch the RS232 port and the S2B port in pass-through mode. The only way to exit this nucleus is via a power off of the player.
601	S2Bengine Checks the S2B interface with the Basic Engine by sending an 'echo' command.
602	Version Returns the version number of the Basic Engine. The version number will also be displayed on the local display. The PLAY key is used to exit this nucleus.
603	Reset Resets the Basic Engine.
604	Focus On Puts the laser of the BE into focus (focus loop).
605	Focus Off Switches the focus loop off.
606	Disc Motor On Switches the disk motor (= spindle motor) on.
607	Disc Motor Off Switches the disk motor (= spindle motor) off.
608	Radial On Closes the radial loop.
609	Radial Off Opens the radial loop.
610	Sledge In Moves the sledge fully inwards.
611	Sledge Out Moves the sledge fully outwards.
612	Grooves In Lets the laser spot jump to the inside limit the disc.
613	Grooves Mid Lets the laser spot jump to the middle of the disc.
614	Grooves Out Let's the laser spot jump to the outside of the disc.
615	Tray In Closes the disc tray.
616	Tray Out Opens the disc tray.
635	DVD Laser On Switches the DVD laser of the BE on.
636	CD Laser On Switches the CD laser of the BE on.
637	Lasers Off Switches the lasers off.

Furore Tests [12]

[xx yy] Number	Nuclei
1200	Write Read SDRam Low The following three individual memory tests will be executed at the lower FURORE SDRAM: a data bus test, an address bus test, and a device test. The first two test for electrical wiring problems and improperly inserted chips, while the third is intended to detect missing chips and catastrophic failures. As an unintended consequence, the device test will also uncover problems with the control bus wiring.
1201	Write Read SDRam High The following three individual memory tests will be executed at the higher FURORE SDRAM: a data bus test, an address bus test, and a device test. The first two test for electrical wiring problems and improperly inserted chips, while the third is intended to detect missing chips and catastrophic failures. As an unintended consequence, the device test will also uncover problems with the control bus wiring.
1202	Write Read Fast SDRam Low The following two individual memory tests will be executed at the lower FURORE SDRAM: a data bus test, and an address bus test. The two test for electrical wiring problems and improperly inserted chips.
1203	Write Read Fast SDRam High The following two individual memory tests will be executed at the higher FURORE SDRAM: a data bus test, and an address bus test. The two test for electrical wiring problems and improperly inserted chips.
1204	Id Gets the revision ID of the FURORE chip.

DAC Board Tests [13]

[xx yy] Number	Nuclei
1300	I2C Checks the interface between the I2C controller on the Hostdecoder and the DAC board.
1301	I2C Enable Enables the I2C interface.
1302	I2C Disable Disables the I2C interface.
1303	Reset Resets the DAC board.
1304	Filter SACD Selects the SACD output filters for the DACs.
1305	Filter Non-SACD Selects the non-SACD output filters for the DACs.
1306	Clock Internal Selects the internal clock of 384 * Fs. (in 44.1kHz mode)
1307	Clock External Selects the external clock. (in non 44.1 kHz mode)
1308	Mute On Switches the mute of the DAC board on.
1309	Mute Off Switches the mute of the DAC board off.
1310	Mode CDDA Switches the DACs into CDDA mode.
1311	Mode DVD48 Switches the DACs into DVD 48 kHz mode.
1312	Mode DVD96 Switches the DACs into DVD96 kHz mode.
1313	Mode DSD Switches the DACs into DSD mode.
1314	Clock Frequency SACD Selects the DAC master clock MCLK for SACD = 384Fs
1315	Clock Frequency CDDA Selects the DAC master clock MCLK for CDDA = 192Fs

Miscellaneous Tests [14]

[xx yy] Number	Nuclei
1400	Clock 11.289 MHz Switches clock A_CLK from the microclock to 11.2896 MHz.
1401	Clock 12.288 MHz Switches clock A_CLK from the microclock to 12.288 MHz.
1402	Clock 24.576 MHz Switches clock A_CLK from the microclock to 24.576 MHz.
1403	Colour Setup I2C Checks the I2C interface with the RGB video processor on the Audio/Video.
1404	Colour Setup High Sets the RGB setting to a high value, changing the intensity.
1405	Colour Setup Low Sets the RGB setting to a low value, changing the intensity.
1406	Colour Setup Normal Sets the RGB setting to a normal value, changing the intensity.
1407	Scart Switch I2C Checks the I2C interface with the scart switch on the Audio/Video board.
1408	Scart Switch Dvd Sets the switch IC on the Audio/Video board to give DVD signal.
1409	Scart Switch Pass Sets the scart IC on the Audio/Video board to pass-through the aux. scart input.

[xx yy] Number	Nuclei
1410	Scart Low Steers pin 16 on the scart connector with the value low (0 to 2 V).
1411	Scart Medium Steers pin 16 on the scart connector with the value medium (4.5 to 7 V).

5.3.4 MENU MODE INTERFACE

Activation

Switch the player on and the following text will appear on the screen of the terminal (program):

```
SACD1000 Diagnostic Software version 0.11

SDRAM Interconnection test passed
Basic SDRAM test passed

(M) enu, (C) ommand or (S) 2B-interface?     [M] : @ M ↵

Main Menu

1    Basic Engine
2    Dac Board
3    Digital Board
4    Frontpanel
5    Log
```

CL 06532152_015.eps
181200

Figure 5-9

The first line indicates that the Diagnostic software has been activated and contains the version number. The next lines are the successful result of the SDRAM interconnection test and the basic SDRAM test. The last line allows the user to choose between the three possible interface forms. If pressing M has made a choice for Menu Interface, the Main Menu will appear.

Menu structure

The following menu structure is given after starting up the SA-12S1 player in menu mode. The symbol → indicates that the current menu choice will invoke the display of a submenu. The number between [ ] mean the nucleus number. These numbers will not be shown on the screen.

Main Menu

1. Basic Engine →
2. Dac Board →
3. Digital Board →
4. Front panel →
5. Log →
6. Scripts →

Basic Engine Menu

1. Disc Motor →
2. Focus →
3. Grooves →
4. Laser →
5. Radial →

7. Tray →
8. Reset [603]
9. S2B Pass [600]
10. S2B Echo [601]
11. Version [602]

Disc Motor Menu

1. Motor On [606]
2. Motor Off [607]

Focus Menu

1. Focus On [604]
2. Focus Off [605]

Grooves Menu

1. Inside of the Disc [612]
2. Middle of the Disc [613]
3. Outside of the Disc [614]

Laser Menu

1. DVD Laser On [635]
2. CD Laser On [636]
3. Lasers Off [637]

Radial Menu

1. On [608]
2. Off [609]

Sledge Menu

1. Move Inwards [610]
2. Move Outwards [611]

Tray Menu

1. Open [616]
2. Close [615]

DAC Board Menu

1. Clock →
2. DAC Mode →
3. Filter SACD →
4. I2C →
5. Mute →
6. Reset [1303]

DAC Clock Menu

1. Clock Internal [1306]
2. Clock External [1307]
3. Clock Frequency SACD [1314]
4. Clock Frequency CDDA [1315]

DAC Mode Menu

1. Mode CDDA [1310]
2. Mode DVD48 [1311]
3. Mode DVD96 [1312]
4. Mode DSD [1313]

DAC Filter Menu

1. Filter SACD [1304]
2. Filter Non-SACD [1305]

DAC IIC Menu

1. I2C Test [1300]
2. I2C Enable Pin On [1301]
3. I2C Enable Pin Off [1302]

DAC Mute Menu

1. Mute On [1308]
2. Mute Off [1309]

Digital Board Menu

1. Furore →
2. Host Decoder →
3. Miscellaneous →

Furore Menu

1. SDRAM Write/Read High [1201]
2. SDRAM Write/Read Low [1200]
3. SDRAM Write/Read Fast High [1203]
4. SDRAM Write/Read Fast Low [1202]
5. Version [1204]

Host Decoder Menu

1. Audio Mute →
2. Centre On Stereo →
3. Colourbar →
4. De-Emphasis →

5. Pink Noise →
6. Sine Generate →
7. Digital Board Version [108]
8. Flash Checksum [100]
9. Flash1 Write Access [101]
10. Flash2 Write Access [102]
11. Flash Write/Read [103]
12. Host SDRAM Write/Read [104]
13. Host SDRAM Write/Read Fast [105]
14. Host DRAM Write/Read [106]
15. Host DRAM Write/Read Fast [107]
16. NVRAM I2C [123]
17. NVRAM Write/Read [122]

Audio Mute Menu
1. Audio Mute On [109]
2. Audio Mute Off [110]

Centre On Stereo Menu
1. Centre-On-Stereo Pin On [113]
2. Centre-On-Stereo Pin Off [114]

Colourbar Menu
1. Colourbar On [120]
2. Colourbar Off [121]

De-Emphasis Menu
1. De-Emphasis On [111]
2. De-Emphasis Off [112]

Pink Noise Menu
1. Pink Noise On [115]
2. Pink Noise On Channel 1 [124]
3. Pink Noise On Channel 2 [125]
4. Pink Noise On Channel 3 [126]
5. Pink Noise On Channel 4 [127]
6. Pink Noise On Channel 5 [128]
7. Pink Noise On Channel 6 [129]
8. Pink Noise Off [116]

Sine Generate Menu
1. Sine On [117]
2. Sine Burst 1kHz [118]
3. Sine Burst 12kHz [119]

Miscellaneous Menu
1. Clock 11.289 MHz [1400]
2. Clock 12.288 MHz [1401]
3. Clock 24.576 MHz [1402]
4. Colour Setup I2C [1403]
5. Colour Setup High [1404]
6. Colour Setup Low [1405]
7. Colour Setup Normal [1406]
8. Scart Pin Low [1410]
9. Scart Pin Medium [1411]
10. Scart Switch I2C [1407]
11. Scart Switch DVD [1408]
12. Scart Switch Pass [1409]

Front Panel Menu
1. Dim Test [618]
2. Echo [500]
3. Light Labels [503]
4. Led Test [504]
5. Keyboard [506]
6. Remote Control [506]
7. Segment Test [502]
8. Version [501]

Log Menu
1. Application Version Read [406]
2. Error Log Read [404]
3. Error Log Reset [407]
4. Lifetime Log Read [405]

Script Menu
1. User/Dealer Script
2. Player Script

5.4 Nuclei Error Codes

In the following tables the error description of the error codes will be described.

5.4.1 Host Decoder Nuclei

Error code	Error description
10000	Test succeeded.
10001	Test failed, checksum is wrong.
10100	Test succeeded.
10101	FLASH 1 Write access test failed.
10200	Test succeeded.
10201	FLASH 2 Write access test failed.
10300	Test succeeded.
10301	FLASH write test failed.
10302	FLASH write command failed.
10303	FLASH write test done max. number of times.
10400	Memory tests succeeded.
10401	Memory databus test goes wrong at wire dy.
10402	Memory addressbus test goes wrong at wire ay.
10403	Physical memory device test goes wrong at address 0xYYYYYYYY.
10500	Memory tests succeeded.
10501	Memory databus test goes wrong at wire dy.
10502	Memory addressbus test goes wrong at wire ay.
10503	Physical memory device test goes wrong at address 0xYYYYYYYY.
10600	Memory tests succeeded.
10601	Memory databus test goes wrong at wire dy.
10602	Memory addressbus test goes wrong at wire ay.
10603	Physical memory device test goes wrong at address 0xYYYYYYYY.
10700	Memory tests succeeded.
10701	Memory databus test goes wrong at wire dy.
10702	Memory addressbus test goes wrong at wire ay.
10703	Physical memory device test goes wrong at address 0xYYYYYYYY.
10800	Test succeeded.
10900	Test succeeded.
10901	Muting audio test failed.
11000	Test succeeded.
11001	Demuting audio test failed.
11100	Test succeeded.
11200	Test succeeded.
11300	Test succeeded.
11400	Test succeeded.

Error code	Error description
11500	Test succeeded.
11501	Set-up of I2C failed.
11502	The selection of the clock source failed.
11504	The demute of the audio failed.
11600	Test succeeded.
11601	Set-up of I2C failed.
11602	The mute of the audio failed.
11700	Test succeeded.
11701	Set-up of I2C failed.
11702	The mute of the audio failed.
11703	The demute of the audio failed.
11704	The selection of the clock source failed.
11707	Set-up of front panel failed.
11708	Front panel keyboard access failed.
11800	Test succeeded.
11801	Set-up of I2C failed.
11802	The mute of the audio failed.
11803	The demute of the audio failed.
11804	The selection of the clock source failed.
11900	Test succeeded.
11901	Set-up of I2C failed.
11902	The mute of the audio failed.
11903	The demute of the audio failed.
11904	The selection of the clock source failed.
12000	Test succeeded.
12100	Test succeeded.
12200	Test succeeded.
12201	I2C bus busy before start.
12202	NVRAM I2C access time-out.
12203	No NVRAM I2C access acknowledge.
12204	NVRAM I2C access time-out.
12205	NVRAM I2C Write/Read back failed.
12300	Test succeeded.
12301	I2C bus busy before start.
12302	NVRAM I2C read access time-out.
12303	No NVRAM I2C read acknowledge.
12304	NVRAM I2C read failed.
12400	Test succeeded.
12401	Test failed.
12500	Test succeeded.
12501	Test failed.
12600	Test succeeded.
12601	Test failed.
12700	Test succeeded.
12701	Test failed.
12800	Test succeeded.
12801	Test failed.
12900	Test succeeded.
12901	Test failed.

5.4.2 NVRAM Nuclei

Error code	Error description
40000	Test succeeded.
40001	I2C access failed.
40100	Test succeeded.
40101	I2C access failed.
40102	Invalid input.
40200	Test succeeded.
40201	I2C access failed.
40202	Invalid input.
40400	Test succeeded.
40401	I2C access failed.
40402	Errorlog in NVRAM is corrupt.
40403	Front panel access failed.
40500	Test succeeded.
40501	I2C access failed.
40502	Front panel access failed.
40600	Test succeeded.
40601	I2C access failed.
40700	Test succeeded.
40701	I2C access failed.
40800	Test succeeded.
40801	I2C access failed.
40900	Test succeeded.
40901	I2C access failed.

5.4.3 Front Panel Nuclei

Error code	Error description
50000	Test succeeded.
50001	I2C bus busy.
50002	I2C read access time-out.
50003	No I2C read acknowledges.
50004	I2C read failed.
50005	I2C write access time-out.
50006	No I2C write acknowledges.
50007	I2C write failed.
50008	No echo response from front panel.
50100	Test succeeded.
50101	I2C connection failed.
50200	Test succeeded.
50201	I2C connection failed.
50202	Test failed.
50300	Test succeeded.
50301	I2C connection failed.
50302	Test failed.
50400	Test succeeded.
50401	I2C connection failed.
50402	Test failed.
50500	Test succeeded.
50501	I2C connection failed.

Error code	Error description
50502	Test failed.
50504	Not all keys were pressed.
50600	Test succeeded.
50601	I2C connection failed.
50602	Test failed.
51800	Test succeeded.
51806	I2C connection failed.
51807	Test failed.

5.4.4 Basic Engine Nuclei

Error code	Error description
60000	Test succeeded.
60100	Test succeeded.
60101	Basic Engine returned error number 0xXX.
60102	Parity error from Basic Engine to Serial.
60103	Communication time-out error.
60104	Unexpected response from Basic Engine.
60105	Echo loop could not be closed.
60106	Wrong echo pattern received.
60200	Test succeeded.
60201	Basic Engine returned error number 0xXX.
60202	Parity error from Basic Engine to Serial.
60203	Communication time-out error.
60204	Unexpected response from Basic Engine.
60300	Test succeeded.
60301	Basic-Engine time-out error.
60400	Test succeeded.
60401	Basic Engine returned error number 0xXX.
60402	Parity error from Basic Engine to Serial.
60403	Communication time-out error.
60404	Unexpected response from Basic Engine.
60405	Focus loop could not be closed.
60500	Test succeeded.
60501	Basic Engine returned error number 0xXX.
60502	Parity error from Basic Engine to Serial.
60503	Communication time-out error.
60504	Unexpected response from Basic Engine.
60600	Test succeeded.
60601	Basic Engine returned error number 0xXX.
60602	Parity error from Basic Engine to Serial.
60603	Communication time-out error.
60604	Unexpected response from Basic Engine.
60700	Test succeeded.
60701	Basic Engine returned error number 0xXX.
60702	Parity error from Basic Engine to Serial.
60703	Communication time-out error.
60704	Unexpected response from Basic Engine.
60800	Test succeeded.
60801	Basic Engine returned error number 0xXX.
60802	Parity error from Basic Engine to Serial.
60803	Communication time-out error.
60804	Unexpected response from Basic Engine.
60805	Radial loop could not be closed.

Error code	Error description
60900	Test succeeded.
60901	Basic Engine returned error number 0xXX.
60902	Parity error from Basic Engine to Serial.
60903	Communication time-out error.
60904	Unexpected response from Basic Engine.
61000	Test succeeded.
61001	Basic Engine returned error number 0xXX.
61002	Parity error from Basic Engine to Serial.
61003	Communication time-out error.
61004	Unexpected response from Basic Engine.
61100	Test succeeded.
61101	Basic Engine returned error number 0xXX.
61102	Parity error from Basic Engine to Serial.
61103	Communication time-out error.
61104	Unexpected response from Basic Engine.
61200	Test succeeded.
61201	Basic Engine returned error number 0xXX.
61202	Parity error from Basic Engine to Serial.
61203	Communication time-out error.
61204	Unexpected response from Basic Engine.
61300	Test succeeded.
61301	Basic Engine returned error number 0xXX.
61302	Parity error from Basic Engine to Serial.
61303	Communication time-out error.
61304	Unexpected response from Basic Engine.
61400	Test succeeded.
61401	Basic Engine returned error number 0xXX.
61402	Parity error from Basic Engine to Serial.
61403	Communication time-out error.
61404	Unexpected response from Basic Engine.
61500	Test succeeded.
61501	Basic Engine returned error number 0xXX.
61502	Parity error from Basic Engine to Serial.
61503	Communication time-out error.
61504	Unexpected response from Basic Engine.
61600	Test succeeded.
61601	Basic Engine returned error number 0xXX.
61602	Parity error from Basic Engine to Serial.
61603	Communication time-out error.
61604	Unexpected response from Basic Engine.
63500	Test succeeded.
63501	Basic Engine returned error number 0xXX.
63502	Parity error from Basic Engine to Serial.
63503	Communication time-out error.
63504	Unexpected response from Basic Engine.
63600	Test succeeded.
63601	Basic Engine returned error number 0xXX.
63602	Parity error from Basic Engine to Serial.
63603	Communication time-out error.
63604	Unexpected response from Basic Engine.
63700	Test succeeded.
63701	Basic Engine returned error number 0xXX.
63702	Parity error from Basic Engine to Serial.

Error code	Error description
63703	Communication time-out error.
63704	Unexpected response from Basic Engine.

5.4.5 Furore Nuclei

Error code	Error description
120000	Test succeeded.
120001	Memory databus test goes wrong at wire dy.
120002	Memory addressbus test goes wrong at wire ay.
120003	Physical memory device test goes wrong at address 0xYYYYYYYY.
120100	Test succeeded.
120101	Memory databus test goes wrong at wire dy.
120102	Memory addressbus test goes wrong at wire ay.
120103	Physical memory device test goes wrong at address 0xYYYYYYYY.
120200	Test succeeded.
120201	Memory databus test goes wrong at wire dy.
120202	Memory addressbus test goes wrong at wire ay.
120203	Physical memory device test goes wrong at address 0xYYYYYYYY.
120300	Test succeeded.
120301	Memory databus test goes wrong at wire dy.
120302	Memory addressbus test goes wrong at wire ay.
120303	Physical memory device test goes wrong at address 0xYYYYYYYY.
120400	Test succeeded.

5.4.6 DAC Nuclei

Error code	Error description
130000	Test succeeded.
130001	I2C bus busy before start.
130011	I2C I/O expander bus busy.
130012	I2C I/O expander read access time-out.
130013	I2C I/O expander no read acknowledge.
130014	I2C I/O expander read failed.
130015	I2C I/O expander write access time-out.
130016	I2C I/O expander no write acknowledge.
130017	I2C I/O expander write failed.
130018	I2C I/O expander failed.
130021	I2C DAC_LR device bus busy.
130022	I2C DAC_LR device read access time-out.
130023	I2C DAC_LR device no read acknowledge.
130024	I2C DAC_LR device read failed.
130025	I2C DAC_LR device write access time-out.
130026	I2C DAC_LR device no write acknowledge.
130027	I2C DAC_LR device write failed.
130028	I2C DAC_LR device failed.
130031	I2C DAC_LSRS device bus busy.
130032	I2C DAC_LSRS device read access time-out.
130033	I2C DAC_LSRS device no read acknowledge.

Error code	Error description
130034	I2C DAC_LSRS device read failed.
130035	I2C DAC_LSRS device write access time-out.
130036	I2C DAC_LSRS device no write acknowledge.
130037	I2C DAC_LSRS device write failed.
130038	I2C DAC_LSRS device failed.
130041	I2C DAC_CLFE device bus busy.
130042	I2C DAC_CLFE device read access time-out.
130043	I2C DAC_CLFE device no read acknowledge.
130044	I2C DAC_CLFE device read failed.
130045	I2C DAC_CLFE device write access time-out.
130046	I2C DAC_CLFE device no write acknowledge.
130047	I2C DAC_CLFE device write failed.
130048	I2C DAC_CLFE device failed.
130100	Test succeeded.
130200	Test succeeded.
130300	Test succeeded.
130301	I2C bus busy before start.
130302	I2C access failed.
130400	Test succeeded.
130401	I2C bus busy before start.
130402	I2C access failed.
130500	Test succeeded.
130501	I2C bus busy before start.
130502	I2C access failed.
130600	Test succeeded.
130601	I2C bus busy before start.
130602	I2C access failed.
130700	Test succeeded.
130701	I2C bus busy before start.
130702	I2C access failed.
130800	Test succeeded.
130801	I2C bus busy before start.
130802	I2C access failed.
130900	Test succeeded.
130901	I2C bus busy before start.
130902	I2C access failed.
131000	Test succeeded.
131001	I2C bus busy before start.
131002	I2C access failed.
131100	Test succeeded.
131101	I2C bus busy before start.
131102	I2C access failed.
131200	Test succeeded.
131201	I2C bus busy before start.
131202	I2C access failed.

Error code	Error description
131300	Test succeeded.
131301	I2C bus busy before start.
131302	I2C access failed.
131400	Test succeeded.
131401	I2C bus busy before start.
131402	I2C access failed.
131500	Test succeeded.
131501	I2C bus busy before start.
131502	I2C access failed.

5.4.7 Miscellaneous Nuclei

Error code	Error description
140000	Test succeeded.
140001	I2C access failed.
140100	Test succeeded.
140101	I2C access failed.
140200	Test succeeded.
140300	Test succeeded.
140301	I2C bus busy.
140302	I2C device write access time-out.
140303	I2C device no write acknowledge.
140304	I2C device write failed.
140400	Test succeeded.
140401	I2C bus busy before start.
140402	I2C access failed.
140403	Setup of SCART switch failed.
140500	Test succeeded.
140501	I2C bus busy before start.
140502	I2C access failed.
140503	Setup of SCART switch failed.
140600	Test succeeded.
140601	I2C bus busy before start.
140602	I2C access failed.
140603	Setup of SCART switch failed.
140700	Test succeeded.
140701	I2C bus busy.
140702	I2C device read access time-out.
140703	I2C device no read acknowledge.
140704	I2C device read failed.
140800	Test succeeded.
140801	Setup of ColourSetup chip failed.
140802	I2C device write failed.
140900	Test succeeded.
140901	Setup of ColourSetup chip failed.
140902	I2C device write failed.
140903	I2C device read failed.
141000	Test succeeded.
141100	Test succeeded.

5.5 Test instructions SACD mono board

5.5.1 General

Impedance of measuring-equipment should be > 1MΩ
Most tests have to be done by software commands. Together with the software command you will find a Ref.# nbr. This is the number of the diagnostic nucleus used for this test. More detailed information can be found in the description of the command mode interface.
Levels: Most measurements are digital measurements. The high and low levels in this document got to have next specification: low : < 0.3V (LVTTL) high : > 3.0V (LVTTL) LOW : < 0.4V (TTL) HIGH: > 4.5V (TTL)
All voltages marked with “stby” have to stay on during standby.
Because all clocks are derived from the SACD clock (384FS_in) from the DAC board, this board should always be connected to the mono board.
The linear power supply is switched on/off by the STB_OUT signal from the mono board to the DAC board.

5.5.2 General start-up measurements

Supply check:

1. Measure the voltages on the pins of the connector 1600 with a multimeter.
2. Also check the following power supplies:

pin	TP	Signal_name	Voltage
1600-1	F604	+3V3	+3V3
1600-2	F604	+3V3	+3V3
1600-3	F631	+5V	+5V (0V during standby)
1600-4	F614	+5Vstby	+5V
1600-5	F615	+6Vstby	+6V
1600-6	F623	GND	0V
1600-7	F623	GND	0V
1600-8	F623	GND	0V
1600-9	F618	-8Vstby	-8V
1600-10	F634	STB_CONT	0V (+5V during standby)
1600-11	F636	+12Vstby	+12V
1600-12	F623	GND	0V
1600-13	F675	PWR_FAIL	+2.1V (1.4V during standby)

Testpoint F608: +3V3 (5%. (Check IC7605 in case of failure)
Testpoint F632: +3V3 (5%. (Check IC7622 in case of failure)
Testpoint F101: +9V (5%. (Check IC7109 in case of failure)

1. Current at the input of the power supply

Check the supply currents to be sure that there are no major failures on the board.
Measure the currents flowing toward the mono board using a Tektronix AM503B current probe on the wires between the switch mode power supply and the connector 1600.

pin	TP	Signal_name	measured
1600-1	F605	+3V3	560 mA
1600-2	F605	+3V3	
1600-3	F631	+5V	510 mA
1600-4	F614	+5Vstby	2 mA
1600-5	F615	+6Vstby	< 1 mA
1600-6	F623	GND	
1600-7	F623	GND	
1600-8	F623	GND	
1600-9	F618	-8Vstby	54 mA
1600-10	F634	STB_CONT	
1600-11	F636	+12Vstby	90 mA
1600-12	F623	GND	
1600-13	F675	PWR_FAIL	

5.5.3 Reset circuitry

Reset of Sti5505:

In power down mode STB_CONT is high; the clock is disabled in order to reduce the power consumption. When STB_CONT goes low, STB_CONTD goes high and enables the 27 MHz clock.
Check that this clock is present and stable before the RESETn is de-asserted. RESETn is a signal, which allows initialising the main processor. We check also that when going from ON mode to stand-by mode, the 27 MHz is held for a certain moment after RESETn is asserted.

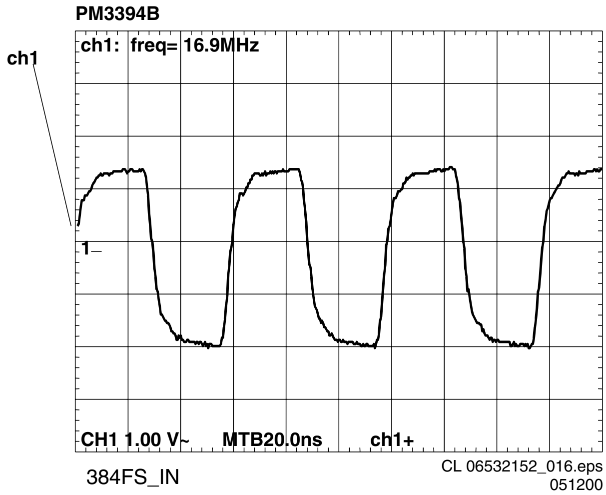
Reset of Servo:

The reset for the Servo circuit is given on Power On to the MACE IC 7207 with POR via C2215, R3234 and D6200. The reset signals STB_DALAS for DALAS and PORN for HD61are generated by MACE IC.
When POR is not working (due to a hang-up situation), an extra reset signal RSTN, coming from the Sti5505 will wake up the Servo circuit.

5.5.4 Clock check

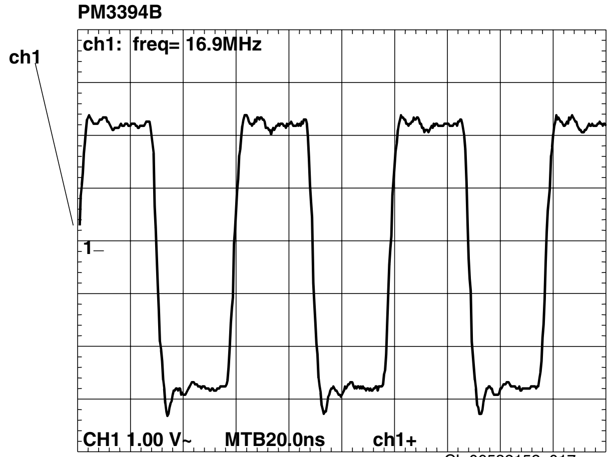
The source clock comes from the DAC board. The SACD CLK is a master clock from which all the other clocks are derived. If this one is not present the system cannot start and work.
The SACD power supply, the mono board and the DAC board should be connected together. On power up the clocks appear on the board. All clocks to be measured have a 0.02% tolerance.

Clockname	Test point	Frequency / level
384Fs_in	F911	16.9344 MHz / 3V3
SACD_CLK	F903	16.9344 MHz / 5V
27M_CLK	F503	27MHz / 5V
PCMCLK_AV	F640	12.288MHz / 3V3
MACE CLOCK	F211	8.46 MHz / 3V3



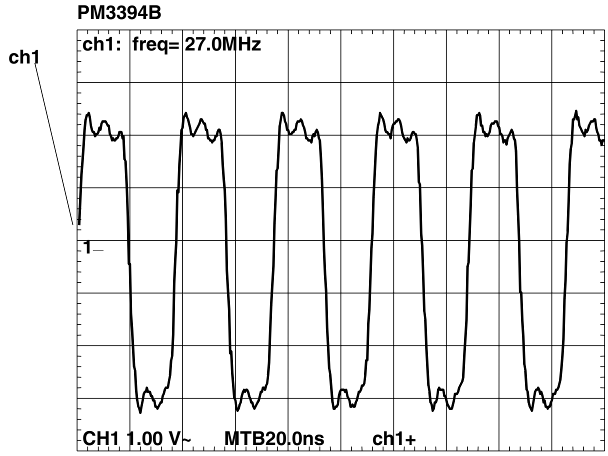
384FS_IN

CL 06532152_016.eps
051200



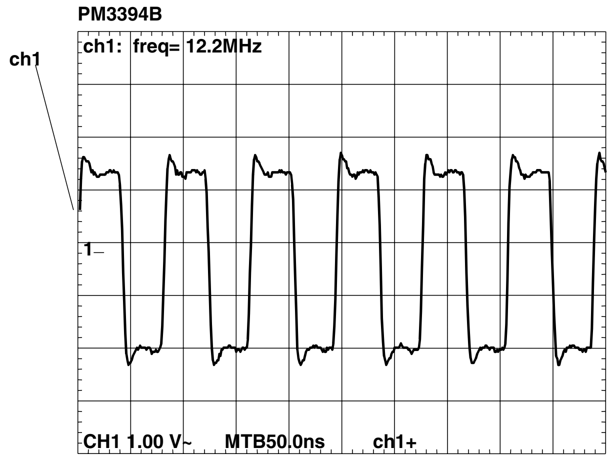
SACD CLK

CL 06532152_017.eps
051200



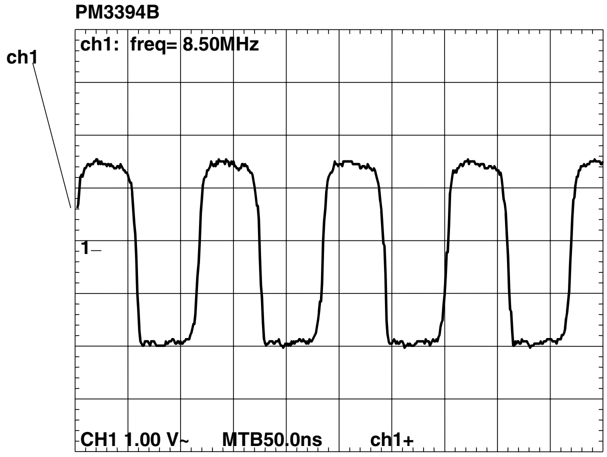
27M_CLK

CL 06532152_018.eps
051200



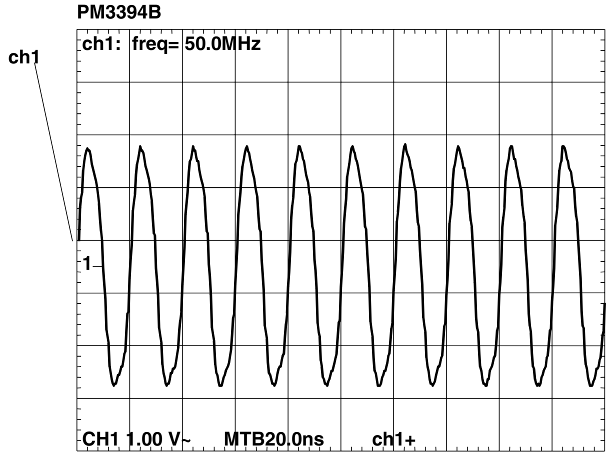
PCM CLK_AV

CL 06532152_019.eps
051200



MACE CLK

CL 06532152_020.eps
051200



ST_CLK

CL 06532152_021.eps
051200

5.5.5 Tests with diagnostic software program

The SACD diagnostic program is included in the SACD application software. This program permits to test a lot of functions of the PCB. We group in this part the memory tests, the general serial bus tests and the peripheral tests of the mono board.

Start up

Conditions
The units required are the SACD power supply, the mono board and the DAC board. This is the minimum set up for the diagnostic program, when testing memories and peripherals. When using the Compair serial cable, pin 1602-2 is directly connected to GND and after powering on, the diagnostic program will be started.
The other end of the service cable is connected to a PC serial port. On the PC you need to open an HyperTerminal and configure it as follows: 19200 b/s, 8 bits data, no parity, 1 stop bit, no control flow.

Start the diagnostic
When you switch on, the diagnostic checks the serial port in both directions, followed by few other commands. Those are done automatically during power up. The following message is displayed on the HyperTerminal: "SACD1000 Diagnostic Software version ...". Then the program is waiting that you select a mode. Getting this screen means the Sti5505 can boot from flash. The program is running and the service interface is functioning. Enter the mode you wish to use. You can use either the Menu mode or the Command mode. In the first mode, the main menu appears, you can navigate into the menu system and you can select the individual command, just type the corresponding number to launch it. In the second mode, just type the Ref.# number to do the test. When a Ref.# command is available in the diagnostic program, it will be explained as follow :

Ref.#	Command Name	Remark

At the end of the test, the diagnostic program will return "OK" if the test is passed. Otherwise an error message will appear.

System clock
ST_CLK is the system clock and is derived from the 27 MHz by the internal PLL of the Sti5505 (pin137).

Name	Test point	Frequency	Level
ST_CLK	F822	49.95 MHz	TTL

Memories

Flashes
Read flash test:
If you can start the diagnostic that means you are able to read the flashes and the program is running. Then you can normally use the diagnostic program. At this moment you can launch the checksum calculation from the diagnostic program.

Ref.#	Command Name	Remark
100	Checksum FLASH	

If you don't encounter any problem during utilisation of the diagnostic program means the Sti5505 is properly connected to the flashes.

SDRAM
Use the diagnostic program for a complete software test of the SDRAM.

Ref.#	Command Name	Remark
104	SDRAM Write Read	Extensive test

I2C bus test

EEprom
To access the EEPROM, the I2C bus is used. So writing and reading back to the EEPROM check the chip and the bus.

Ref.#	Command Name	Remark
123	NVRAM I2C	Quick test - Write and read back

The complete EEPROM can also be checked but it takes a lot of time to write and read back at all the locations.

Ref.#	Command Name	Remark
122	NVRAM write read	Extensive test - Write and read-back

Display board
The mono board accesses to the display board through the I2C bus. You can test this serial bus up to the connector 1501. So connect the display board to the mono board and launch either the following command :

Ref.#	Command Name	Remark
500	Echo	Write and read back
501	version	Software version of the slave processor rom

S2B bus

The S2B is the interface between the digital part and the front end. This bus links the STi5505 and the MACE2. The S2B echo command permits to check the communication between those devices.

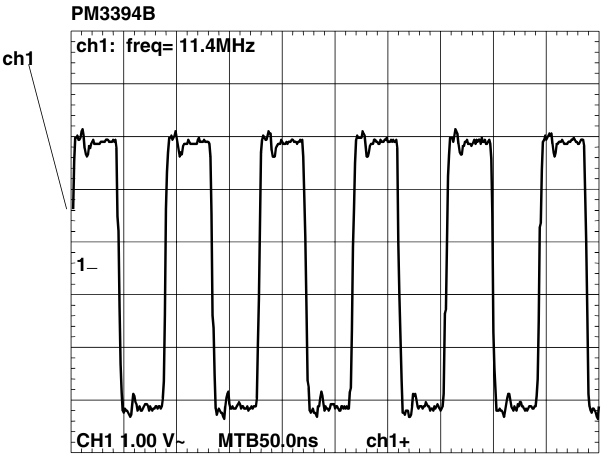
Ref.#	Command Name	Remark
601	S2b Echo	Write and read back

Peripherals

Audio clock select

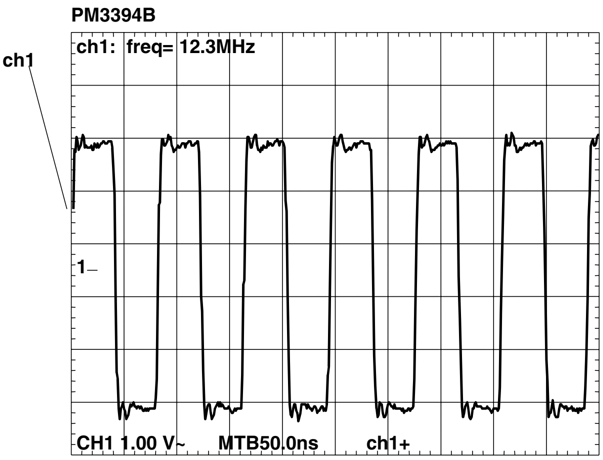
This clock is derived from the SACD CLOCK by the mono board system clocks. The audio PCM_CLK can take 3 values. The Sti5505 PIO's permit to select 3 different frequencies depending on the application. Check those frequencies on F566

Ref.#	Command Name	Frequency	SEL_ACLK2	SEL_ACLK1
1400	Clock 11.289 MHz	11.2896 MHz	0	1
1401	Clock 12.288 MHz	12.288 MHz	1	0
1402	Clock 24.576 MHz	24.576 MHz	1	1



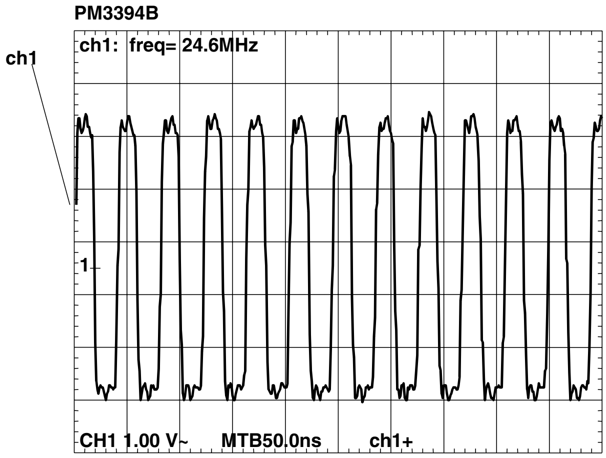
PCM clk 11,298MHz

CL 06532152_022.eps
051200



PCM clk 12.288MHz

CL 06532152_023.eps
051200



PCM clk 24.576MHz

CL 06532152_024.eps
051200

Audio mute

Ref.#	Command Name	MUTE_AV at F625	Remark
109	Mute ON	+4.8V	Audio Mute On
110	Mute OFF	-8V	Audio Mute Off

Center on/Mono

Check whether we can switch between the mono mode and the stereo mode. Measure the level on F633.

Ref.#	Command Name	Center on	Remark
113	Centre-On-Stereo Pin On	3.3V	Mono
114	Centre-On-Stereo Pin Off	0V	Stereo

I2C DAC

Check whether you can enable or disable the I2C switch. When driving the I2C_DAC signal measure the corresponding level at F001.

Ref.#	Command Name	level
1301	I2C enable	H = 5V
1302	I2C disable	L = 0V

Slow blanking

An additional part of the video-path is the scart-switching or slow blanking voltage.
This voltage can be 0V, 6V. Check at F620 the output voltage with next commands:

Ref.#	Command Name	Remark	Level
1410	Scart Low	No picture	0V ± 0.5V
1411	Scart Medium	16/9 format	6V ± 10%

PCM Audio on I2S bus

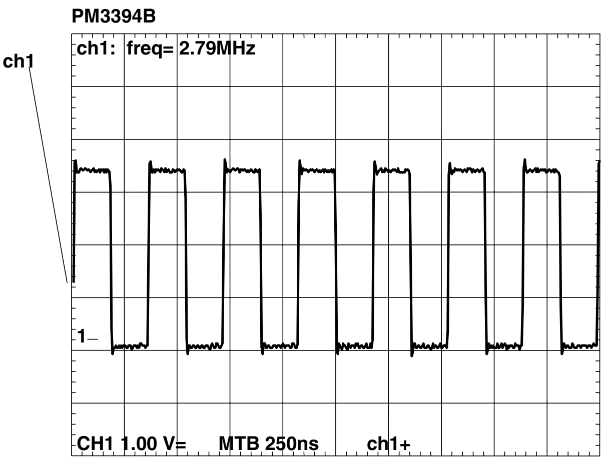
For this test connect the A/V board and the front panel to the monoboard. Don't forget to power up the front panel. The I2S audio signals are measured in 3 different situations: no audio, sine wave is played, pink noise is played.

No audio

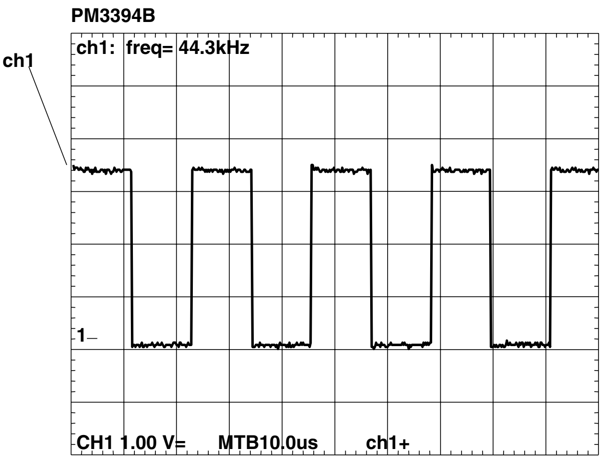
Switch ON the power supplies and check these signals

Signal	Test point	type	Level	Frequency
SCLK_AV	F637	Clock	LVTTL	2.82MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTL	44.1KHz < 0.02%
PCM_CLK_AV	F640	No signal	LVTTL	N/A
PCMOUT_AV	F638	No signal	LVTTL	N/A

Signal	Test point	type	Level	Frequency
PCM_Ce_Lf_Fur	F659	No signal	LVTTL	N/A
PCM_LsRs_Fur	F504	No signal	LVTTL	N/A
SPDIF	F644	Data stream	TTL	N/A



SCLK_AV CL 06532152_025.eps 051200



LRCLK_AV CL 06532152_026.eps 051200

Sine wave
Generate the sine wave with the following command

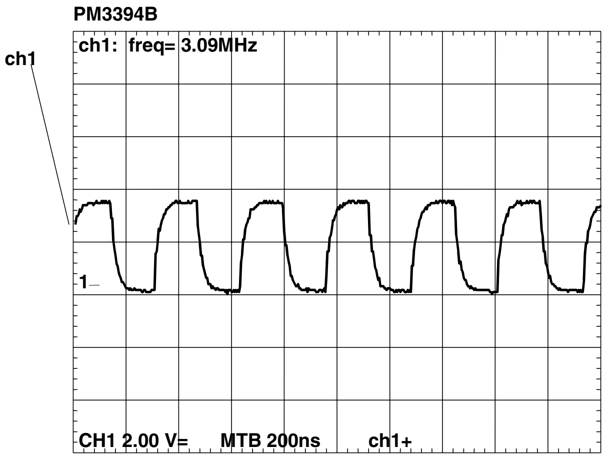
Ref.#	Command Name	Remark
117	Sine ON	Play the sine wave at the audio outputs

Then measure the following signals

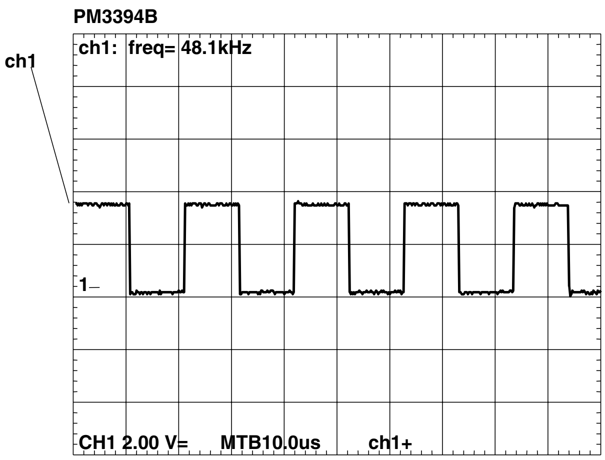
Signal	Test point	type	Level	Frequency
SCLK_AV	F637	Clock	LVTTL	3.072MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTL	48 kHz < 0.02%
PCMCLK_AV	F640	Clock	LVTTL	12.288 MHz < 0.02%
PCMOUT_AV	F638	Data stream	LVTTL	N/A
PCM_Ce_Lf_Fur	F659	No signal	LVTTL	N/A

Signal	Test point	type	Level	Frequency
PCM_LsRs_Fur	F504	No signal	LVTTL	N/A
SPDIF	F644	Data stream	TTL	N/A

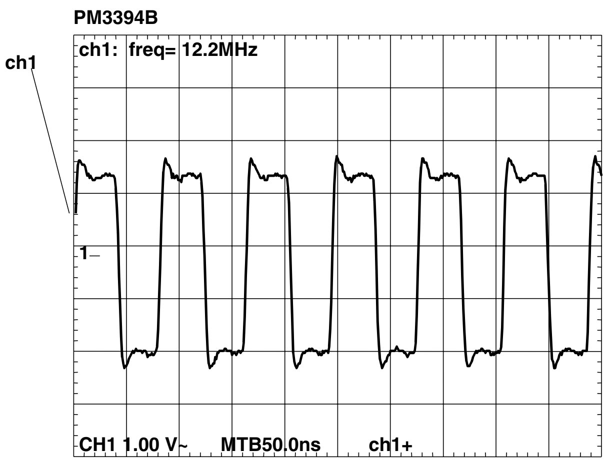
Press “STOP” to switch off the sine wave.



SCLK_AV 3.072MHz CL 06532152_027.eps 051200



LRCLK_AV 48kHz CL 06532152_028.eps 051200



PCM CLK_AV CL 06532152_029.eps 051200

Pink noise
Generate the pink noise with the following command

Ref.#	Command Name	Remark
115	Pink Noise ON	Play the pink noise at the audio outputs

Then measure the following signals

Signal	Test point	type	Level	Frequency
SCLK_AV	F637	Clock	LVTTL	3.072MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTL	48 kHz < 0.02%
PCM_CLK_AV	F640	Clock	LVTTL	12.288 MHz < 0.02%
PCMOUT_AV	F638	Data stream	LVTTL	N/A
PCM_Ce_Lf_Fur	F659	Data stream	LVTTL	N/A
PCM_LsRs_Fur	F504	Data stream	LVTTL	N/A
SPDIF	F644	Data stream	TTL	N/A

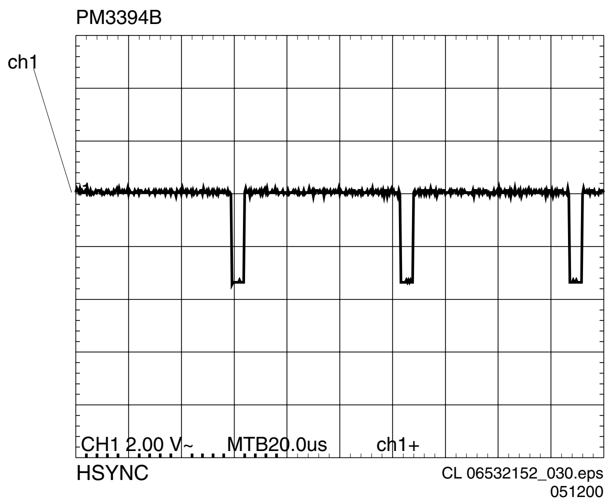
5.5.6 Video

From the diagnostic program, play the 8 colour bar pattern.

Ref.#	Command Name	Remark
120	Colour bar On	8-color bar pattern
121	Colour bar Off	Disable the pattern

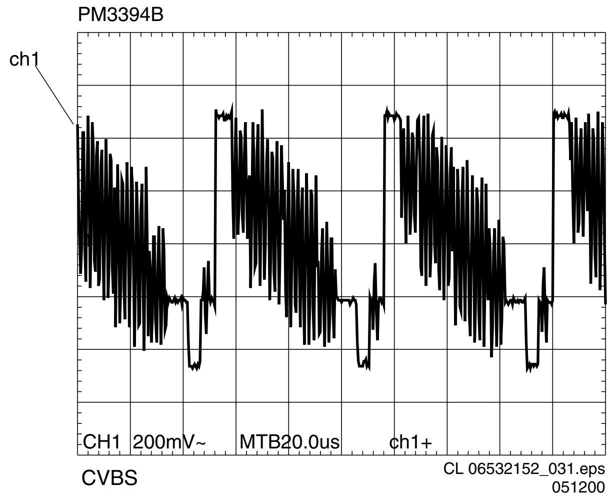
Video Hsync
Measure this output at F656

Ref.#	Command Name	Remark	Value
120	Colour bar On		15.625 kHz ± 0.02% Vpeak-peak > 3V

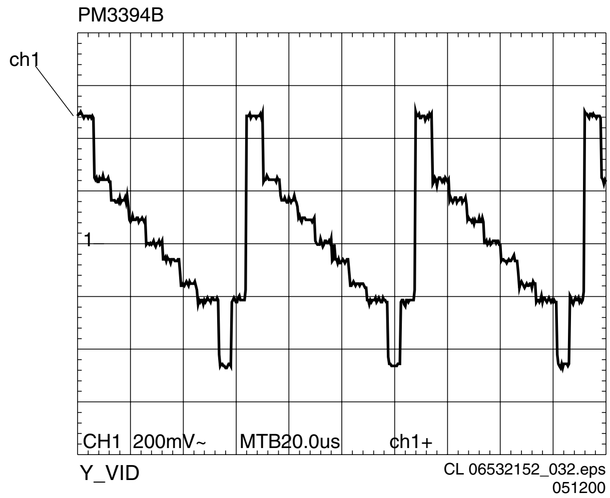


Video signals

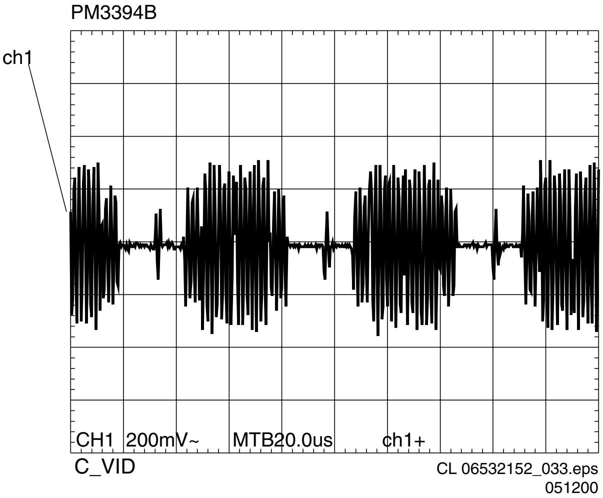
CVBS
Measured at F657



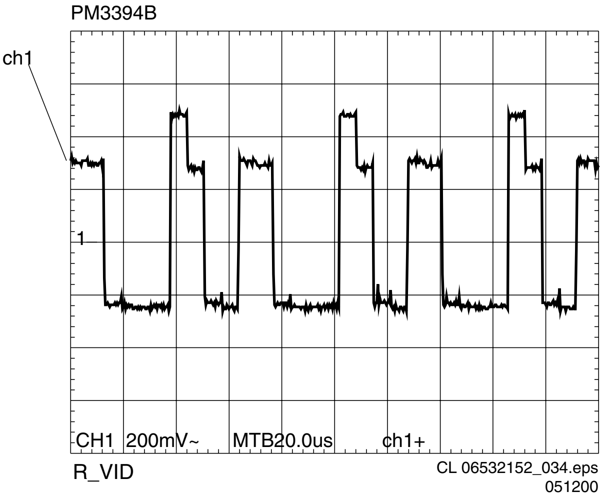
Luminance Y-VID
Measured at F662



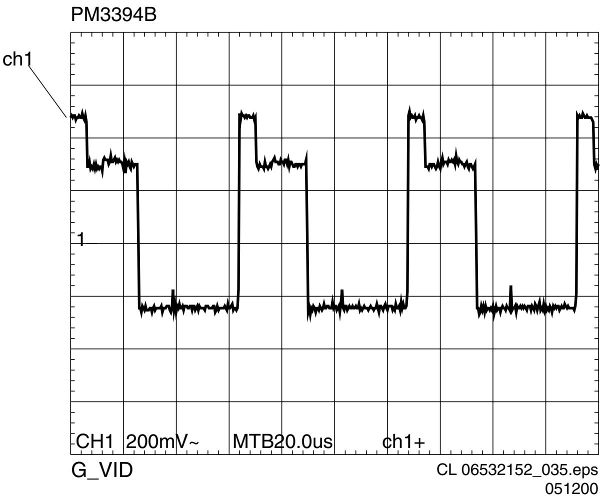
Chrominance C_VID
Measured at F665



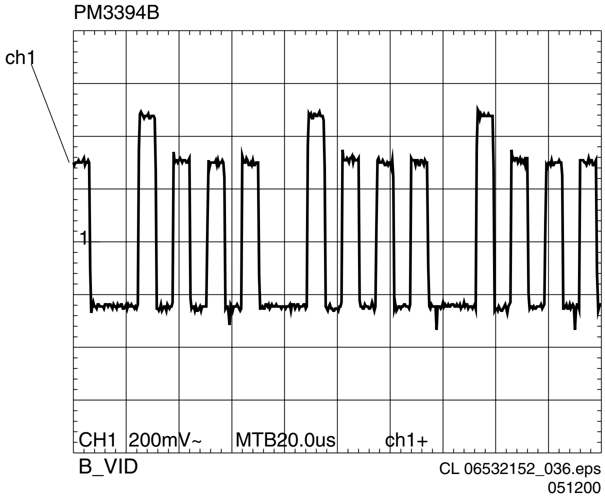
Red R_VID
Measured at F646



Green G_VID
Measured at F649



Blue B_VID
Measured at F653



Switch off the colour bar with the following command:

Ref.#	Command Name	Remark	Value
121	Colour bar Off		Disable the pattern

SACD Processor/Furore
With the following commands, the access of the Furore and its SDRAM is checked.

Ref.#	Command Name	Remark
1204	DS_FURORE_Id	Check Furore ID
1200	DS_FURORE_Sdram WrRLow	Check full speed SDRAM
1201	DS_FURORE_Sdram WrRHigh	Check full speed SDRAM
1202	DS_FURORE_Sdram WrRLowFast	Check full speed SDRAM
1203	DS_FURORE_Sdram WrRHighFast	Check full speed SDRAM

RF signal amplitude
This signal is measured at F851 just at the input of the Furore. When no disc is in the player, we measured 54 mV. Then a disc is inserted and played, at this moment the RF signal increases. We measured 1.05 V amplitude and the level of this input should be between 0.2V and 1.5 V. Then we can play normally a SACD disc.

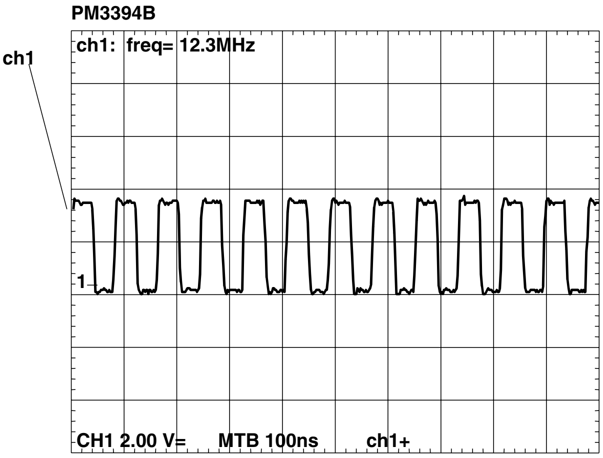
DSD outputs
With the diagnostic software, we can partially test the DSD_PCM bus toward the DAC board. When you play a pink noise, digital bit stream is coming out of the Furore and is fed to the DAC board.

Ref.#	Command Name	Remark
115	Pink Noise ON	Play the pink noise at the audio outputs

Measure the following signals

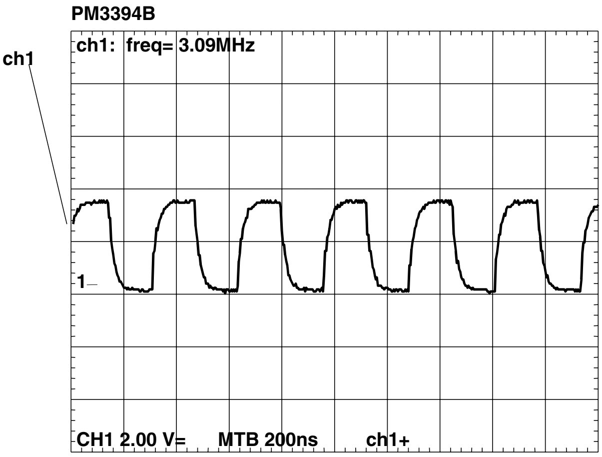
Signal	Test point	type	Level	Frequency
DSD_PCM(8)	F002	Clock	LVTTL	12.288 MHz < 0.02%
DSD_PCM(6)	F003	Clock	LVTTL	3.072 MHz < 0.02%
DSD_PCM(7)	F004	Clock	LVTTL	48 kHz < 0.02%
DSD_PCM(0)	F005	Data stream	LVTTL	N/A

Signal	Test point	type	Level	Frequency
DSD_PCM(1)	F006	Signal : High	LVTTL	N/A
DSD_PCM(4)	F007	Data stream	LVTTL	N/A
DSD_PCM(5)	F008	Signal : High	LVTTL	N/A
DSD_PCM(2)	F009	Data stream	LVTTL	N/A
DSD_PCM(3)	F010	Signal : High	LVTTL	N/A



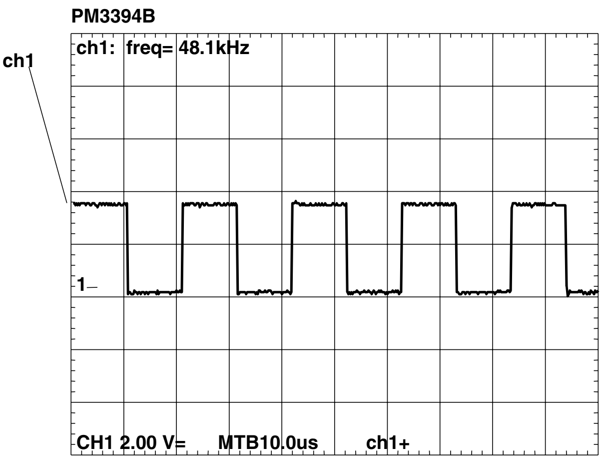
DSD_PCM8

CL 06532152_037.eps
051200



DSD_PCM6

CL 06532152_038.eps
051200



DSD_PCM7

CL 06532152_039.eps
051200

5.5.7 SERVO TESTS

General start-up measurements:

Reset the Basic Engine part

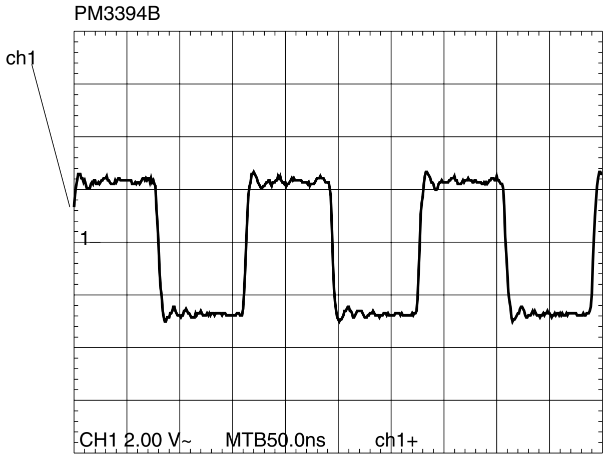
Ref. #	Command Name	Remark
603	BeReset	Reset Basic Engine

Check Vref

Name	Testpoint	Value
Vref	F188	2.5V+/-0.3

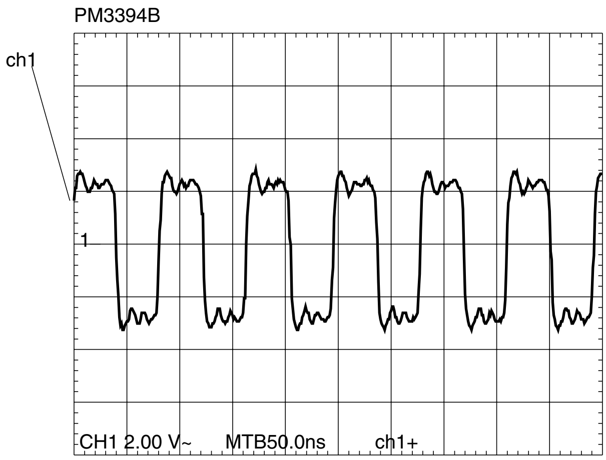
Check I2S interface

Name	Testpoint	Value
B_BCLK	F347	6.0MHz +/-0.1
CL1	F337	12.0MHz +/-0.2
B_WCLK	F343	HIGH
Stopclk	F338	HIGH
B_Sync	F344	HIGH
B_V4	F348	HIGH



B_BCLK

CL 06532152_040.eps
051200



CL1

CL 06532152_041.eps
051200

Disc Motor:
Before switching on the disc motor, check the following test points:

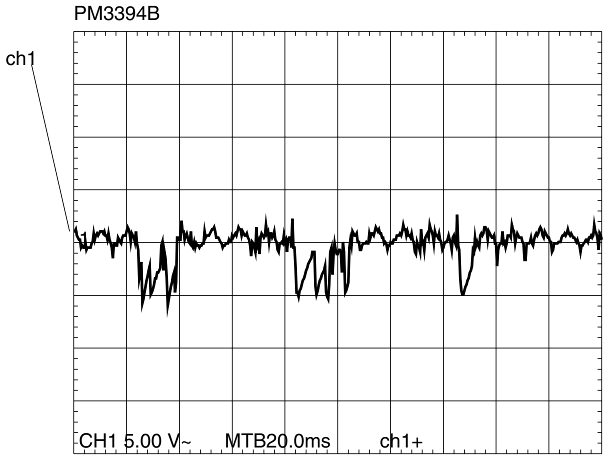
Name	Testpoint	Value
Stby	F357	high
Stby-out	F355	LOW
Moto1	F361	3V±0.3

Switch the Discmotor on/off with next commands:

Ref. #	Command Name	Remark
606	BeDiscmotorOn	Discmotor on
607	BeDiscmotorOff	Discmotor off

Check the following signals when discmotor has been switched on:

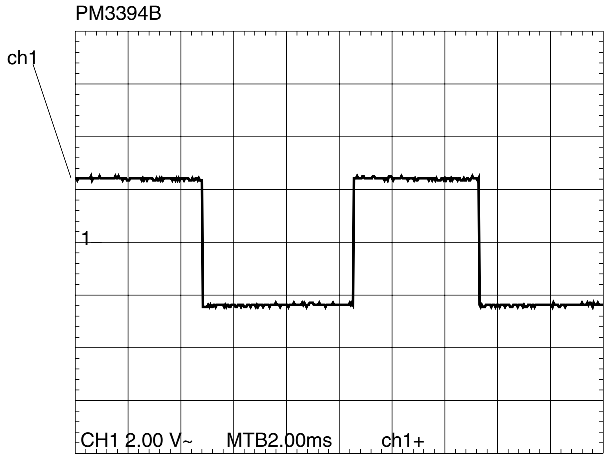
Name	Pin nr.	Frequency
Stby	F357	low
Stby-out	F355	HIGH
Moto1	F361	2V±0.5V
A3	F350	see oscillo-gram
A2	F352	see oscillo-gram
A1	F353	see oscillo-gram



A1-A2-A3

CL 06532152_042.eps
051200

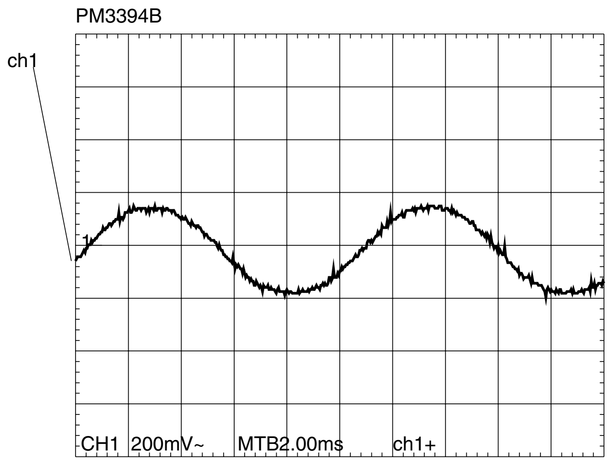
T1	F280	see oscillogram
T2	No testpoint present	see oscillogram
T3	F371	see oscillogram



T1-T2-T3

CL 06532152_043.eps
051200

VH	F365	3V±0.5V
H1+	F354	see oscillogram
H1-	F359	see oscillogram
H2+	F364	see oscillogram
H2-	F366	see oscillogram
H3+	F367	see oscillogram
H3-	F370	see oscillogram



H1-H2-H3

CL 06532152_044.eps
051200

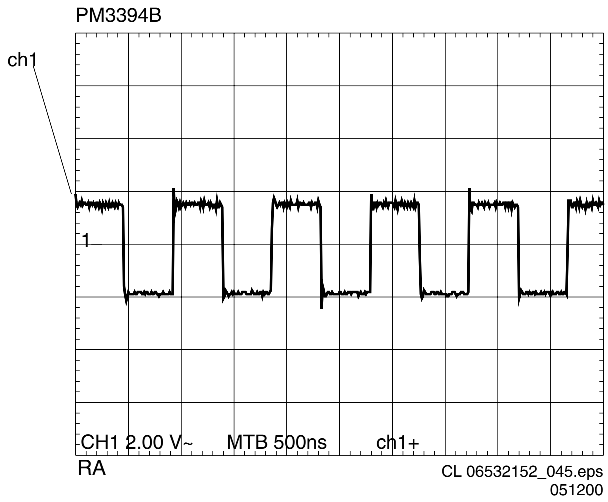
Switch the discmotor off.

Radial
Swith the radial control on/off with the following commands:

Ref. #	Command Name	Remark
608	BeRadialOn	Radial control on
609	BeRadialOff	Radial control off

Check the following signals:
Check for pulse density signal RA at testpoint F227

Name	Testpoint	Value
Rad -	F128	4.3V±0.5V
Rad +	F121	4.3V±0.5V

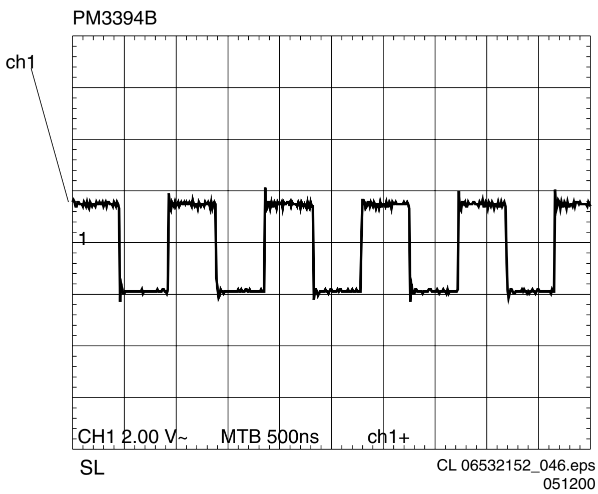


Check if laser is switched on (visual check of laserlight).
Switch the radial control off.

Sledge
Use the following commands to move the sledge:

Ref. #	Command Name	Remark
610	BeSledgeIn	Sledge inwards
611	BeSledgeOut	Sledge outwards

Check pulse density signal SL at testpoint F221



Name	Testpoint	Value
Sl -	F039	4.5V±0.5V
Sl +	F038	4.5V±0.5V

Measure peak to peak signal on SL- and SL+ while moving sledge outwards.

Name	Testpoint	Value
Sl -	F039	10Vptp +/-0.5
Sl +	F038	10Vptp +/-0.5

Measure input sledge control (sledge in home position)

Name	Testpoint	Value
Sinph	F182	1.5V±0.5V
Cosph	F192	1.5V±0.5V

Tray:
To open and close the tray use the following commands:

Ref. #	Command Name	Remark
615	BeTrayIn	Tray in
616	BeTrayOut	Tray out

Measure the driver outputs of the BA5938FM for the tray closed.

Name	Testpoint	Value
Vo2 -	F116	4.3V±2.0V
Vo2 +	F111	4.3V±2.0V

Measure again the driver outputs while the tray is opening.

Name	Testpoint	Value
Vo2 -	F116	6.0V±1.0V
Vo2 +	F111	2.0V±1.0V

Measure again the driver outputs while the tray is closing

Name	Testpoint	Value
Vo2 -	F116	2.0V±1.0V
Vo2 +	F111	6.0V±1.0V

Focus
To switch the Focus motor on/off, use the following commands:

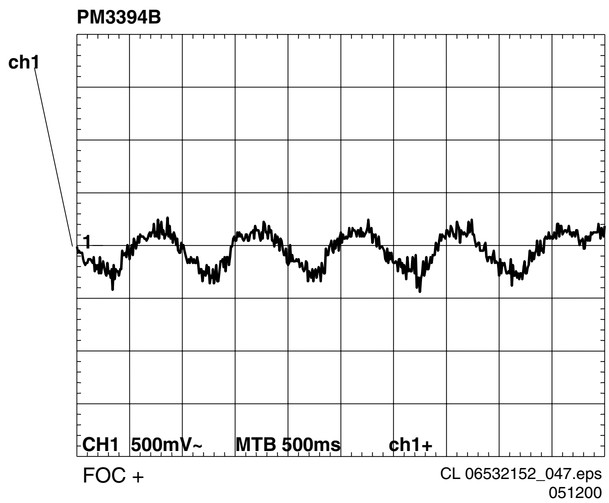
Ref. #	Command Name	Remark
604	BeFocusOn	Focus on
605	BefocusOff	Focus off

Measure the driver outputs of the BA5938FM for the Focus off.

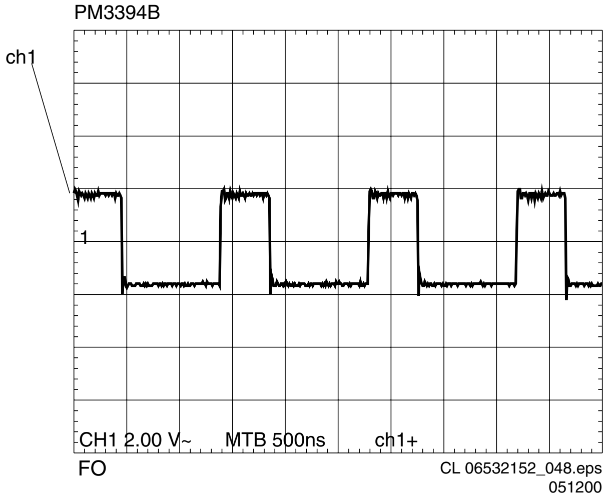
Name	Testpoint	Value
foc -	F124	4.3V±0.5V
foc +	F127	4.3V±0.5V

Switch the focus on
Measure again the driver outputs

Name	Testpoint	Value
Foc - (sawtooth)	F124	1V±0.2V
Foc + (sawtooth)	F127	1V±0.2V



Check for pulse density signal FO at testpoint F234



Check for laserlight.
Switch the focus off

Hf path
Play DVD test disc.
Measure outputs of diodes A, B, C, D, E, F.

Name	Testpoint	Value
A	F140	2.6V±0.2V
B	F141	2.6V±0.2V
C	F143	2.6V±0.2V
D	F144	2.6V±0.2V
E	F147	2.6V±0.2V
F	F148	2.6V±0.2V

Measure DVDALAS outputs

Name	Testpoint	Value
RFO DC	F146	2.5V ± 0.2V, eyepattern 1Vptp
O1	F155	25mV±10mV
O2	F158	25mV±10mV
O3	F168	25mV±10mV
O4	F165	25mV±10mV
S1	F174	25mV±10mV
S2	F175	25mV±10Mv

5.6 Test instructions Display board

5.6.1 Display board

Introduction
These test instructions are written for all versions of the display PCB.
The contents of the PCB can be split up into next blocks:

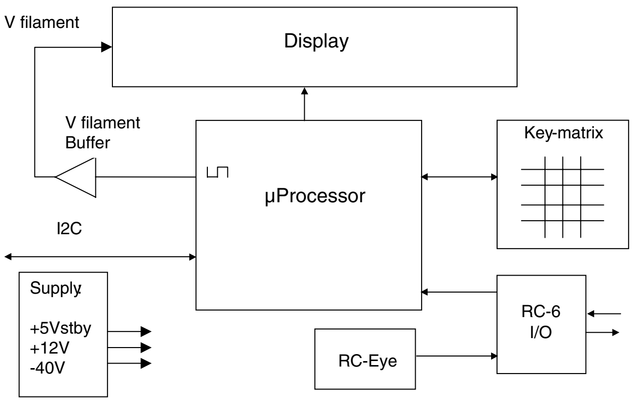


Figure 5-10

Functionality description:
The essential component of the display PCB is the uP (slave). This slave works on an 8MHz resonator and has a reset circuit that is triggered by the +5Vstby. After the reset pulse, the standby control line will release the reset of the host uP. This host uP will then initialise the slave. In addition, when going to stand-by, the slave will put the host uP in reset. When the slave receives the right IR or key code to leave the standby mode, the reset of the host uP will be released.
Other slave functions are:

- Square signal generator to generate the filament voltage, which is required for an AC FTD.
- Generates the grid and segment scanning for the FTD.
- Generates a scanning grid for the keys (separated from display scanning).
- Has inputs for RC (RC5 and RC6).

General

- Oscilloscope measurements have been carried out using a Philips PM3392A.
- Impedance of measuring-equipment should be > 1MΩ.
- To do correct measurements we recommend to use supply 3122 427 21370, which is used in all "second generation B" DVD-players. Make sure that the main 3.3V has a 0.7A load.

Reset

Check next reset timing with an oscilloscope at pin 10 of the (processor.

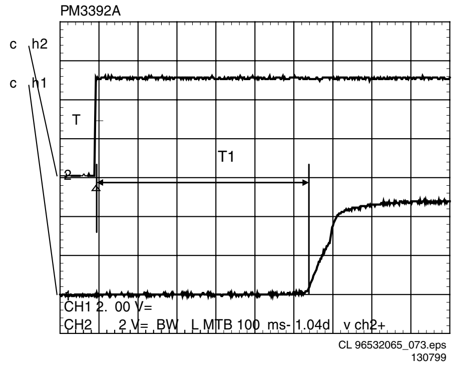


Figure 5-11

Timing: 400msec < T1 > 700msec.
CH1: +5Vstby voltage at power on.
CH2: Voltage at pin 10.

Display steering

Check next timing and level for all grid-lines (G1 - G14).

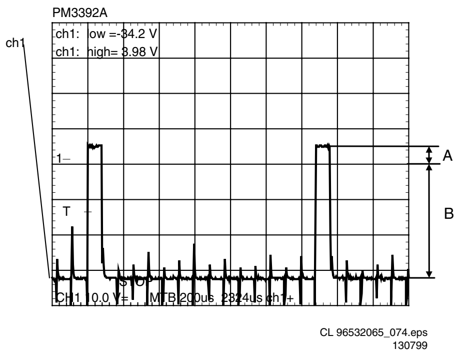


Figure 5-12

1. Check level A: +4V5 ±10% for grid lines 1 => 11
2. Check level A: +4V0 ±10% for grid lines 12 => 14
3. Check level B: -33V ±10%
4. Check timing and levels of segment-lines P1 - P10:

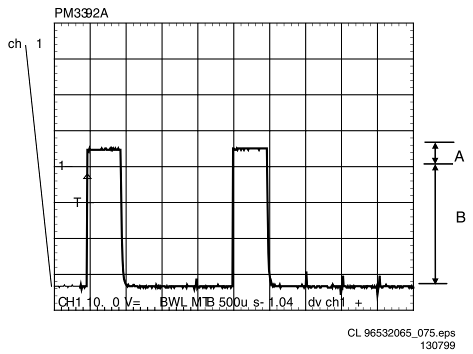


Figure 5-13

Level A:+4V5 ±10%
Level B:-33V ±10%
The data on these segment lines depend on the characters that are displayed.
The characters can be set by sending I2C commands to the display.
See the Slave URS how to send a display command.

Key-matrix

Connect a extra 10k(pull-up to pin 36 en 37 of the uP and check next matrix scanning at these pins.

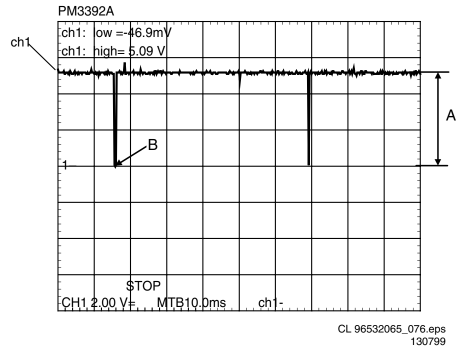


Figure 5-14

Level A: 5.0V ±7%
Level B: 0V ±200mV
Check matrix scanning from pin 26 until 33 of the uP.
The results should be the same as the diagram above.

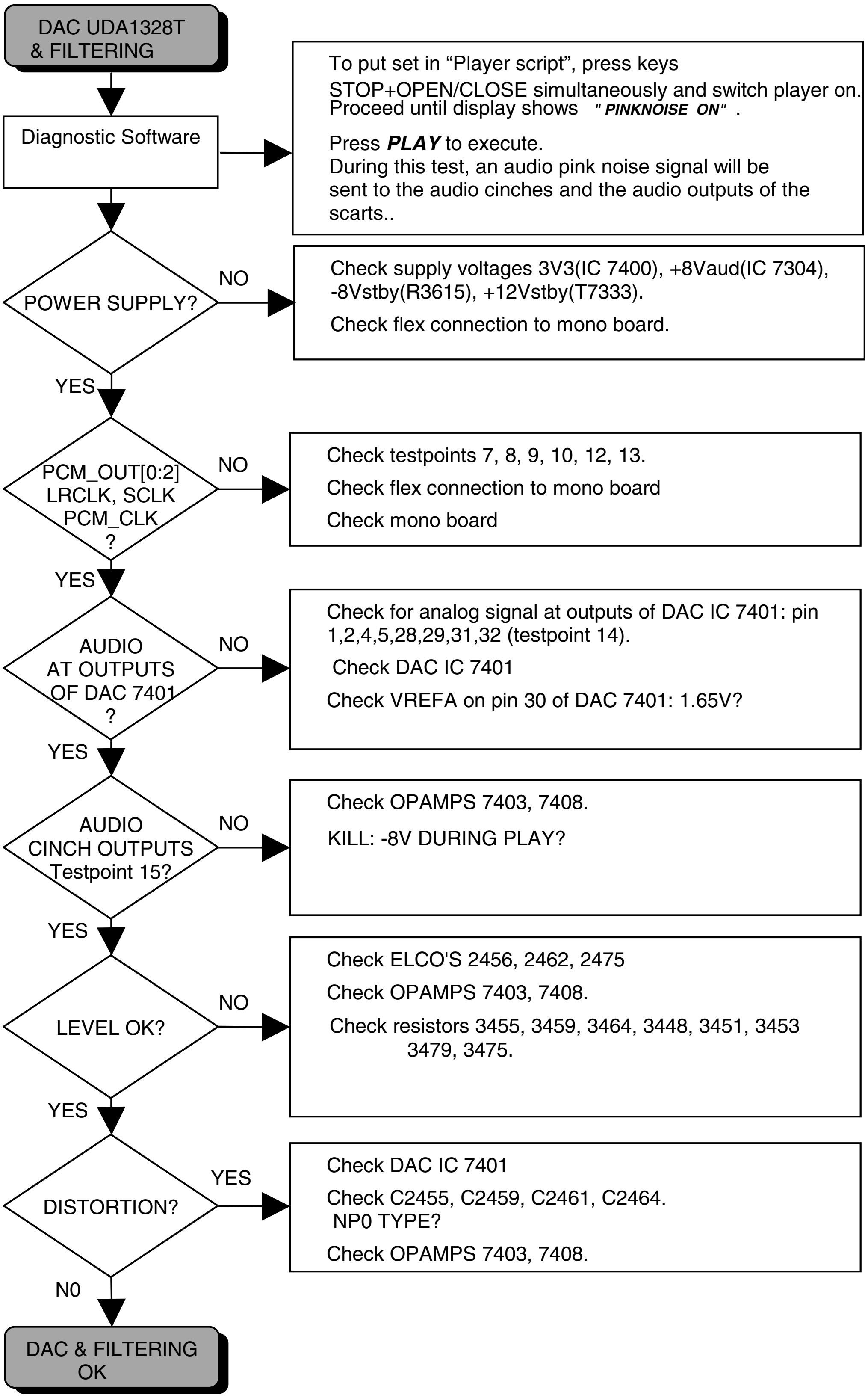
I.R. receiver

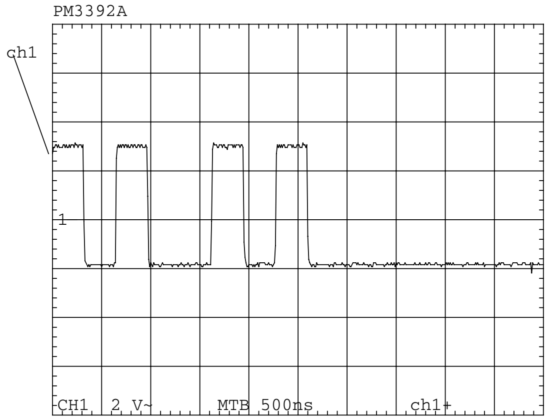
Check at pin 23 of the (P if this line switches from low (< 0.3V) to high (> 4.5V), while pressing a key on a Philips RC5 or RC6 remote control.

5.7 Trouble shooting AV Board

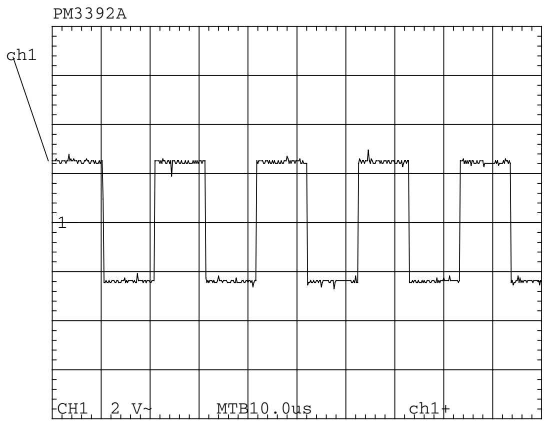
Testing of A/V board can be done using diagnostic software “Player script”.
Mono board is used to generate a sound with the sound tests PINKNOISE ON and SINE ON.
A VIDEO signal is generated with COLOUR-B ON.
Functional control of scart switching is also possible.

AUDIO PART

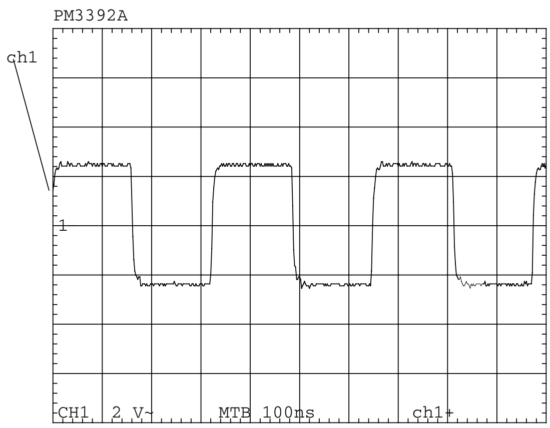




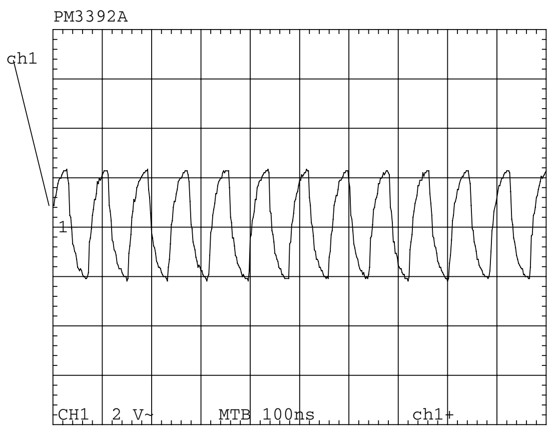
TP 7: PCM_OUT0



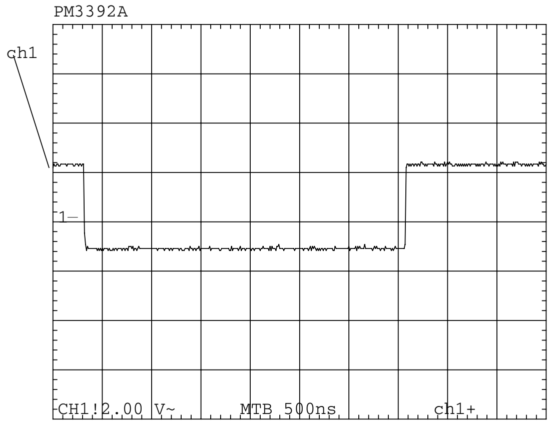
TP8: LRCLK



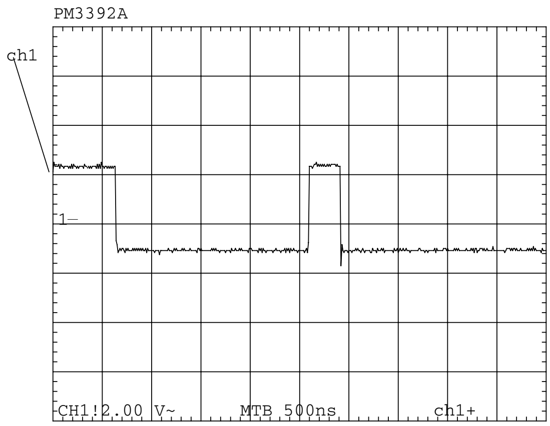
TP9: SCLK



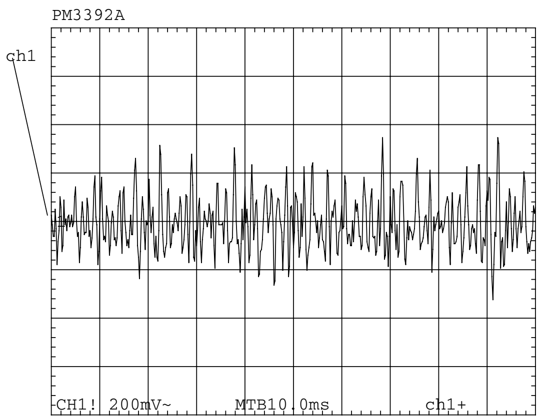
TP10: PCM_CLK



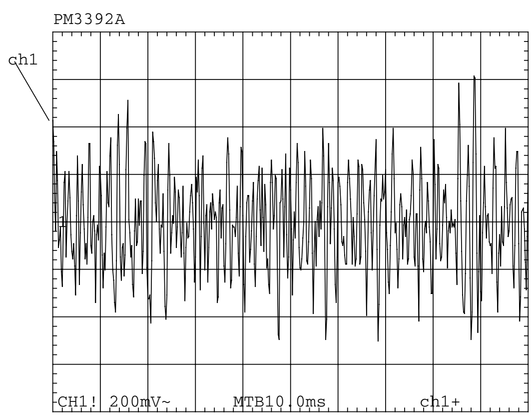
TP12: PCM_OUT2



TP13: PCM_OUT1

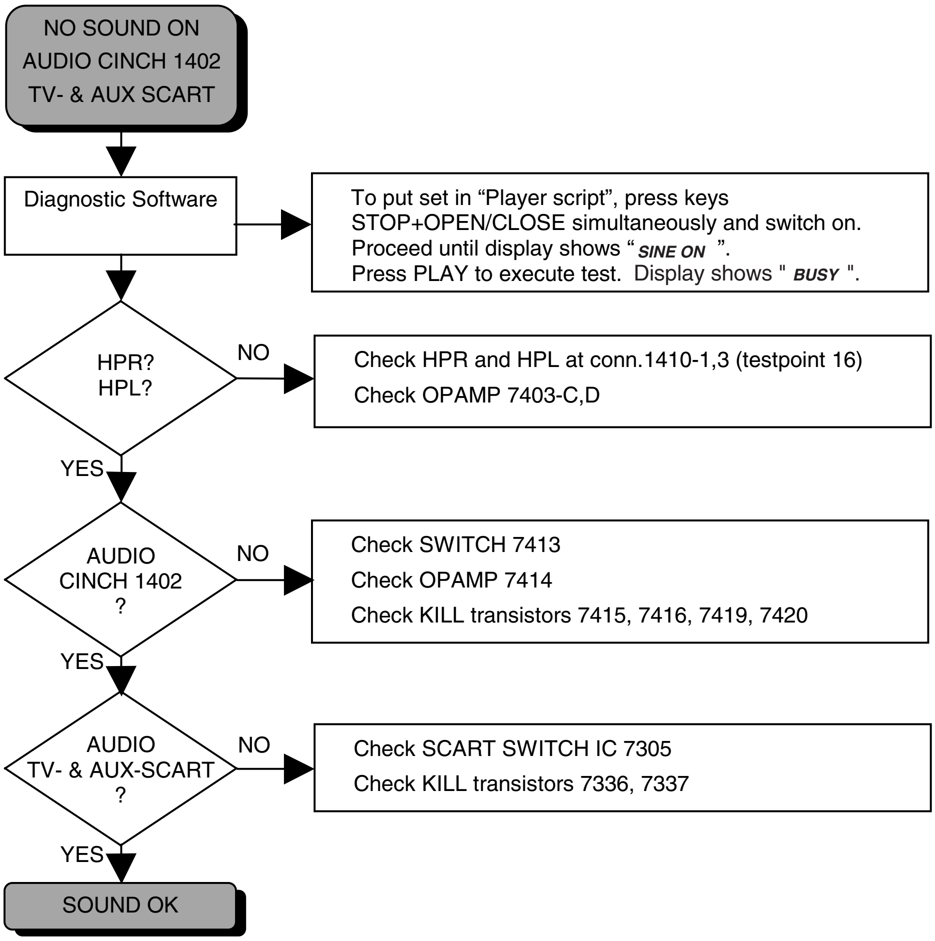


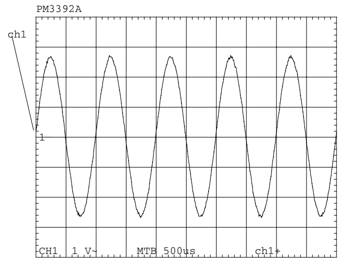
TP14: ANALOG OUT DAC (PINK NOISE)



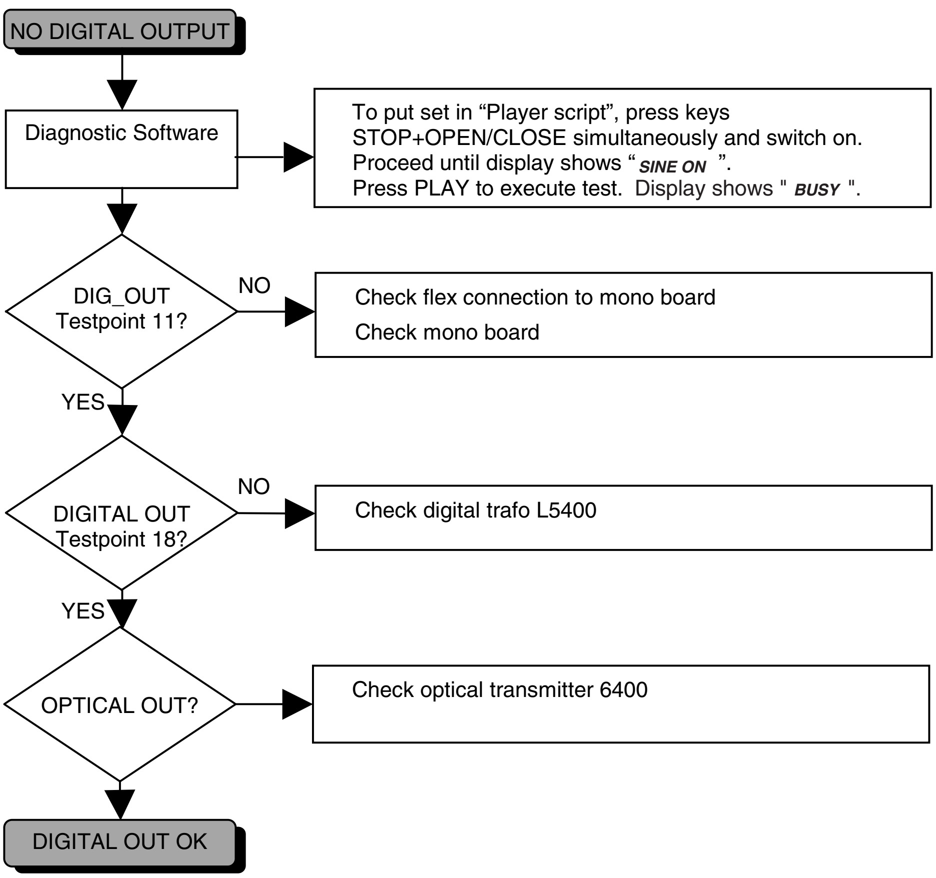
TP15: ANALOG OUT AUDIO CINCH(PINK NOISE)

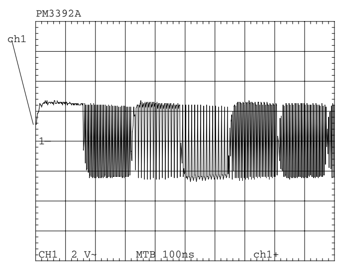
CL 06532152_091.eps
131200



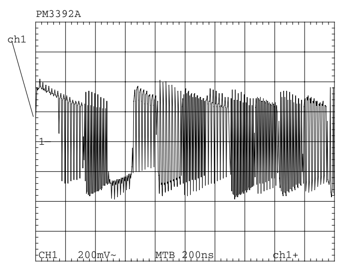


TP 16 : ANALOG OUTPUT AUDIO HP_R & HP_L



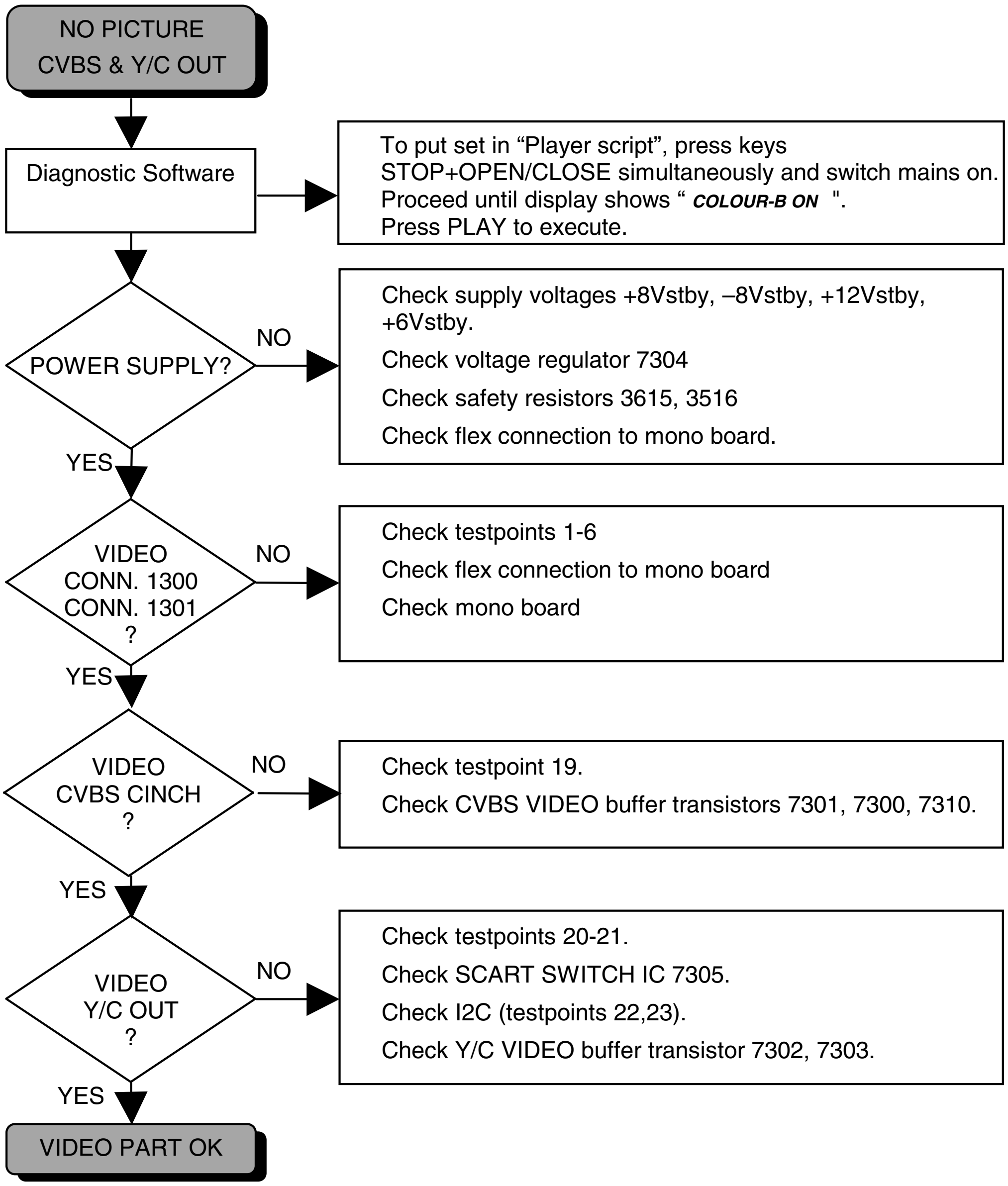


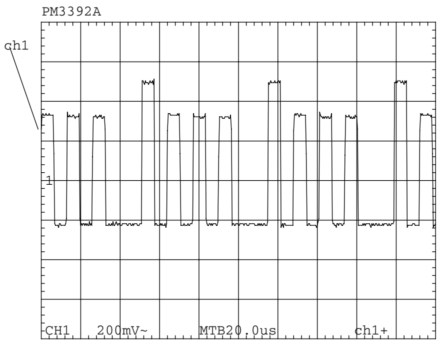
TP 11: DIG_OUT



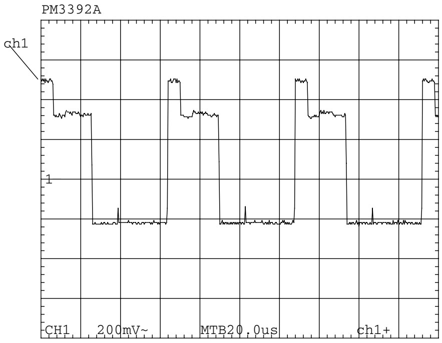
TP 18: DIGITAL OUT

VIDEO PART

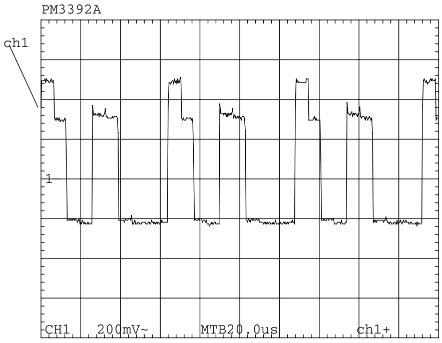

NO PICTURE
CVBS & Y/C OUT
Diagnostic Software
To put set in “Player script”, press keys
STOP+OPEN/CLOSE simultaneously and switch mains on.
Proceed until display shows “ COLOUR-B ON ".
Press PLAY to execute.
POWER SUPPLY?
NO
Check supply voltages +8Vstby, –8Vstby, +12Vstby, +6Vstby.
Check voltage regulator 7304
Check safety resistors 3615, 3516
Check flex connection to mono board.
YES
VIDEO
CONN. 1300
CONN. 1301
?
NO
Check testpoints 1-6
Check flex connection to mono board
Check mono board
YES
VIDEO
CVBS CINCH
?
NO
Check testpoint 19.
Check CVBS VIDEO buffer transistors 7301, 7300, 7310.
YES
VIDEO
Y/C OUT
?
NO
Check testpoints 20-21.
Check SCART SWITCH IC 7305.
Check I2C (testpoints 22,23).
Check Y/C VIDEO buffer transistor 7302, 7303.
YES
VIDEO PART OK



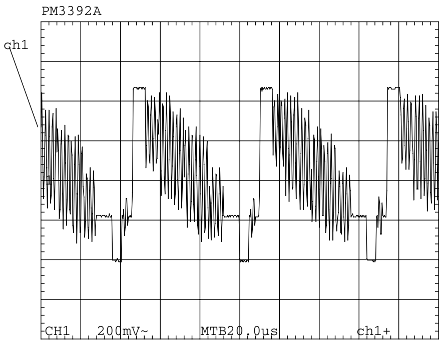
TP 1 : video B



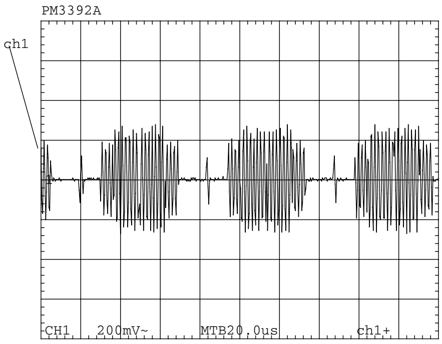
TP 2 : video G



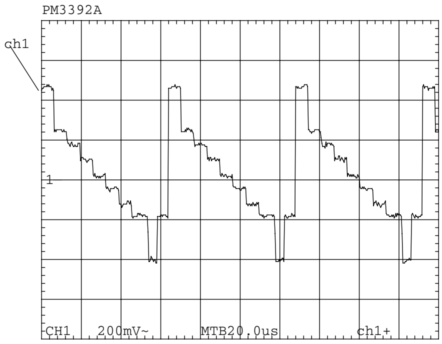
TP 3 : video R



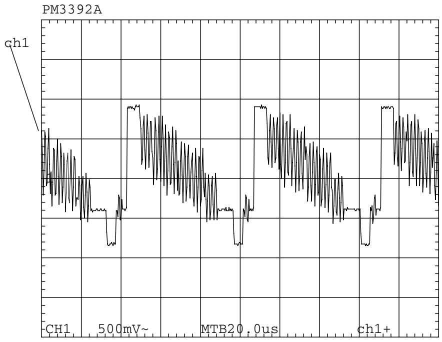
TP 4 : CVBS



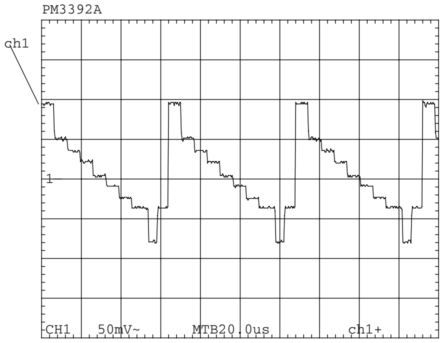
TP 5 : C_ENC



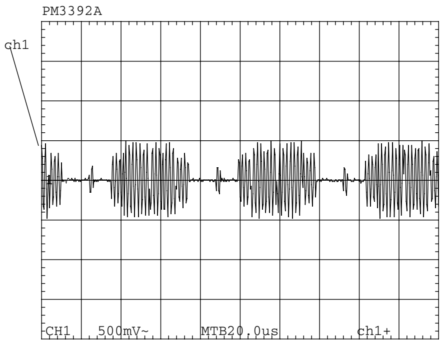
TP 6 : Y_ENC



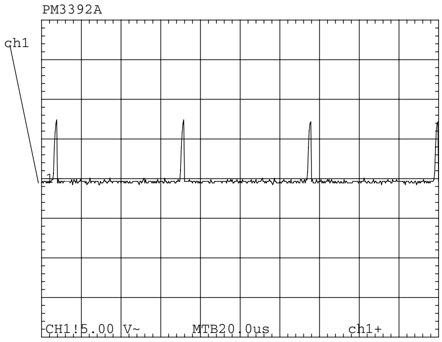
TP 19 : CVBS_OUT



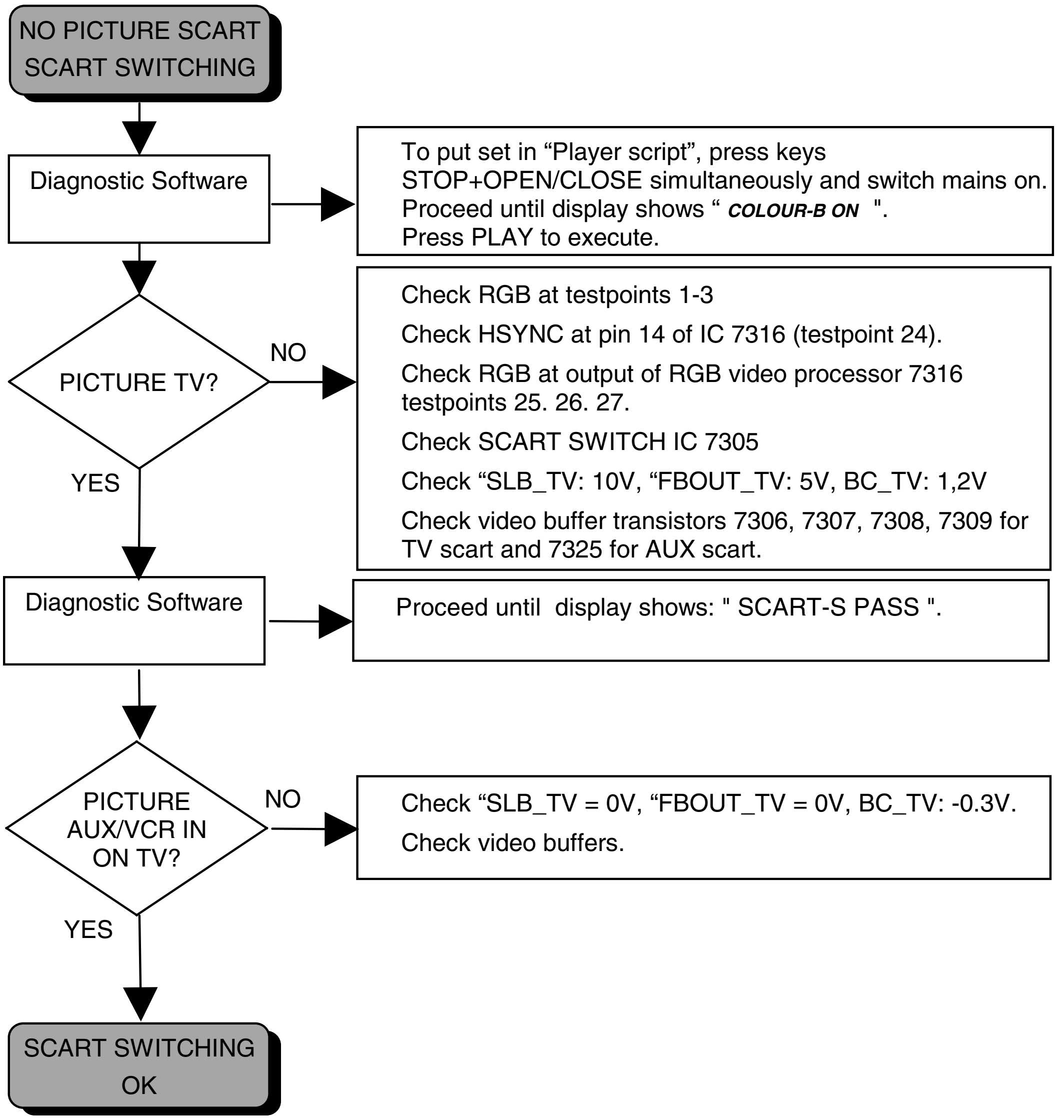
TP20: Y_OUT



TP 21: C_OUT



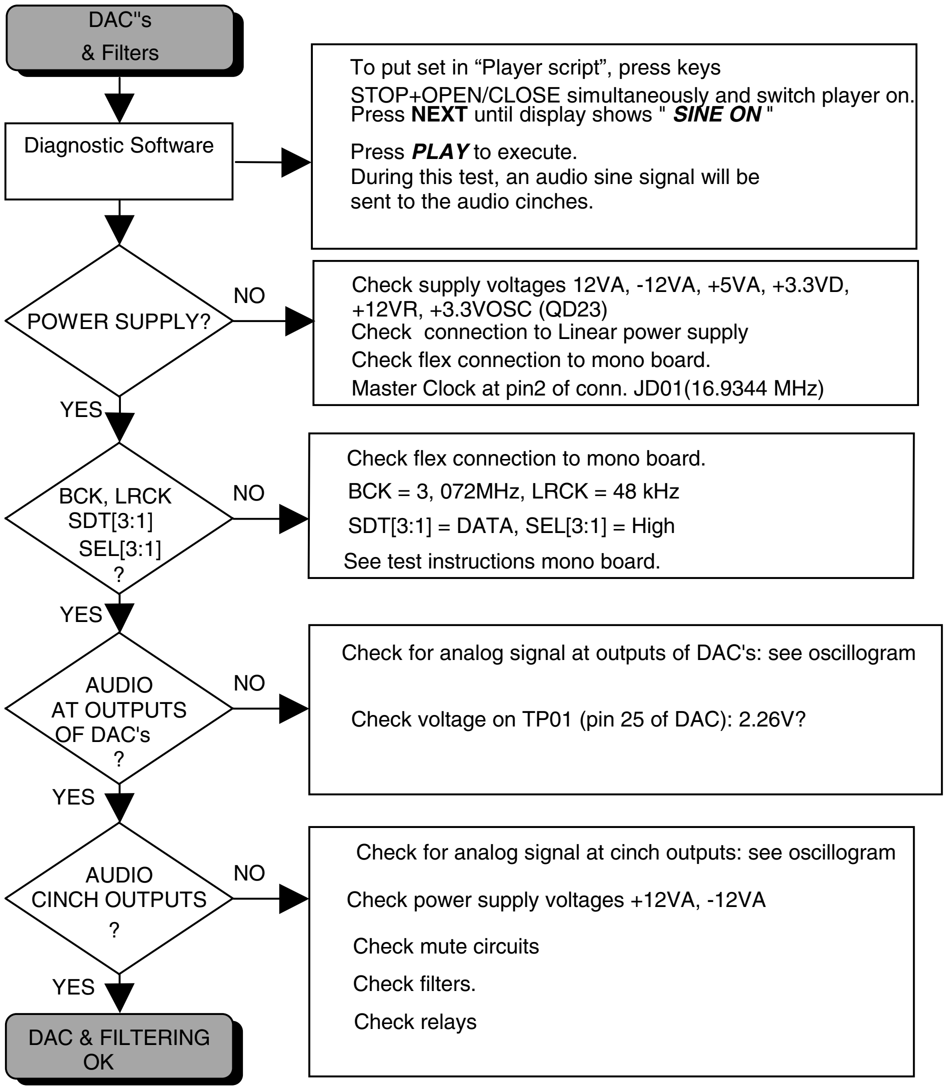
TP24: HSYNC

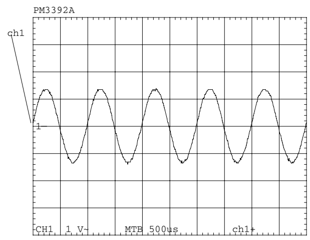

NO PICTURE SCART
SCART SWITCHING
Diagnostic Software
To put set in “Player script”, press keys
STOP+OPEN/CLOSE simultaneously and switch mains on.
Proceed until display shows “ COLOUR-B ON ".
Press PLAY to execute.
PICTURE TV?
NO
YES
Check RGB at testpoints 1-3
Check HSYNC at pin 14 of IC 7316 (testpoint 24).
Check RGB at output of RGB video processor 7316 testpoints 25. 26. 27.
Check SCART SWITCH IC 7305
Check “SLB_TV: 10V, “FBOUT_TV: 5V, BC_TV: 1,2V
Check video buffer transistors 7306, 7307, 7308, 7309 for TV scart and 7325 for AUX scart.
Diagnostic Software
Proceed until display shows: " SCART-S PASS ".
PICTURE
AUX/VCR IN
ON TV?
NO
YES
Check “SLB_TV = 0V, “FBOUT_TV = 0V, BC_TV: -0.3V.
Check video buffers.
SCART SWITCHING
OK

5.8 Trouble shooting DAC Board

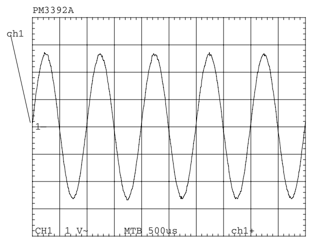
TROUBLESHOOTING DAC BOARD

Testing of DAC board can be done using diagnostic software “Player script”.
Mono board is used to generate a sound with the sound test SINE ON.



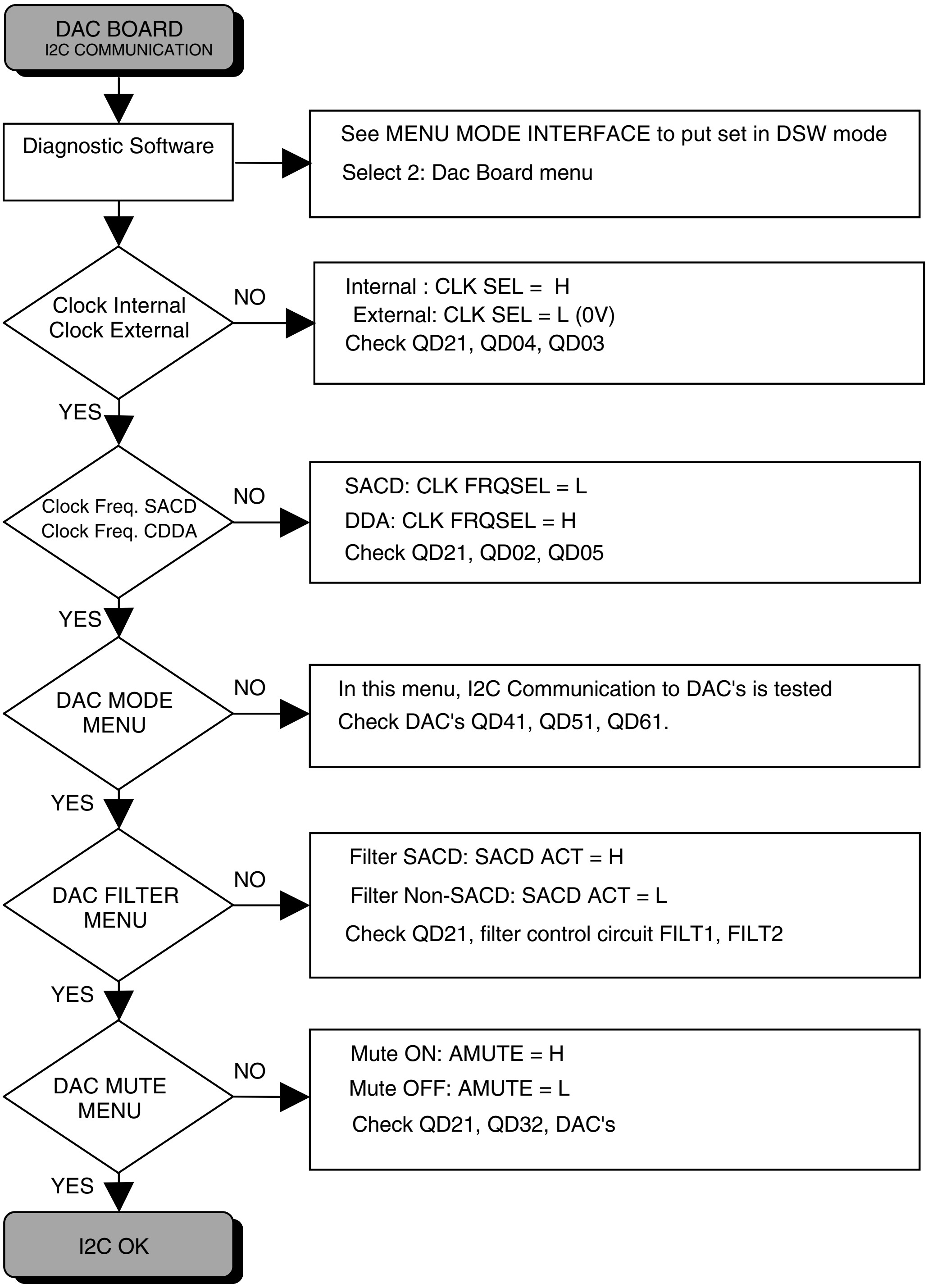


ANALOG OUTPUT DAC



ANALOG OUTPUT AUDIO CINCH

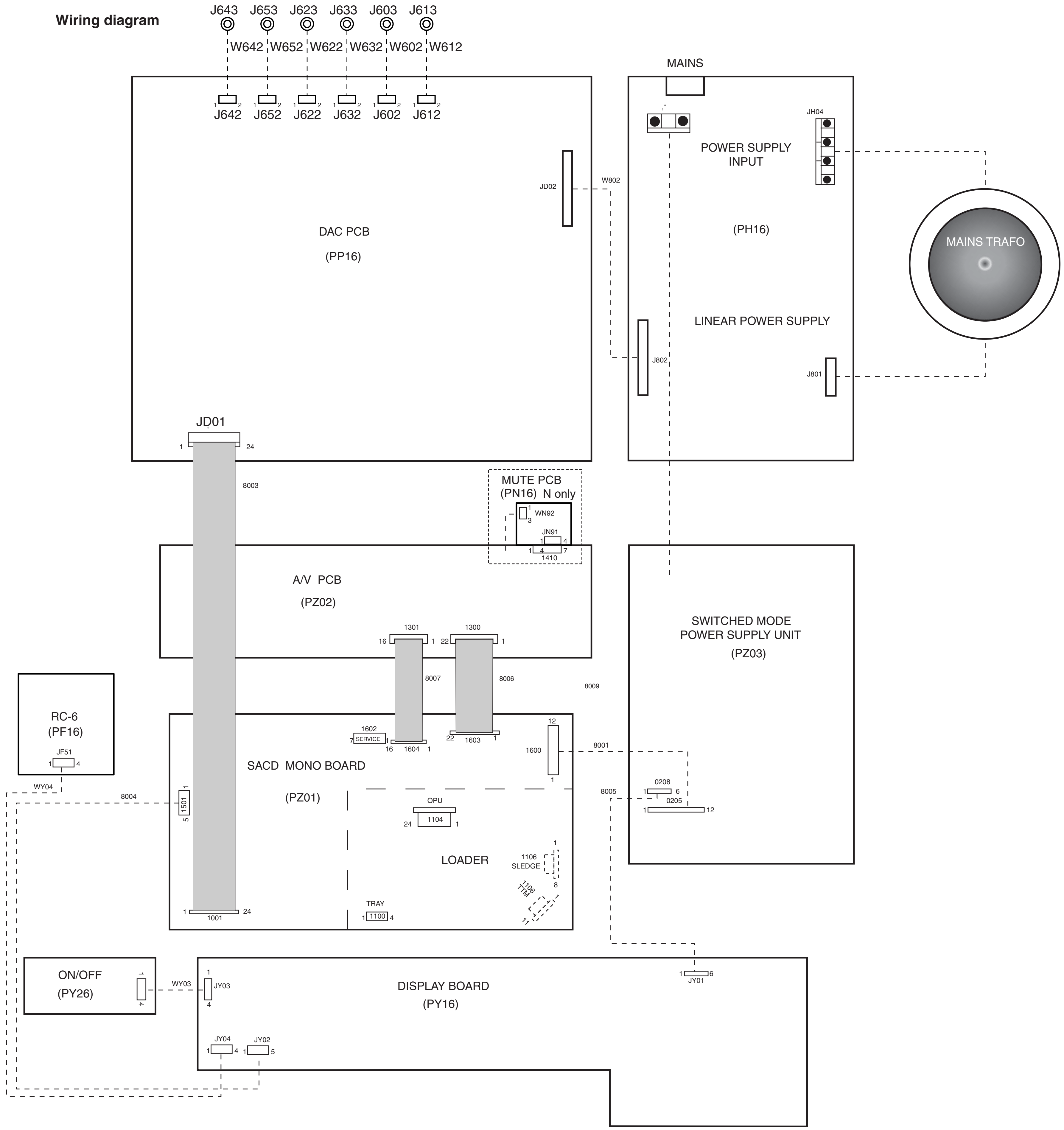
Testing of I2C communication to DAC board can be done using diagnostic software.



Personal notes:

6. Wiring and block diagram

Wiring diagram



8001	
1	+3V3
2	+3V3
3	+5V
4	+5Vstby
5	+6Vstby
6	GND
7	GND
8	GND
9	-8Vstby
10	STB_CONT
11	+12Vstby
12	GND
13	PWR_FAIL

W802	
1	AGND
2	AGND
3	+12VA
4	-12VA
5	DAGND
6	+5VA
7	+3.3VD
8	GND
9	GND
10	RELAY
11	AMUTE
12	RGND
13	+12R
14	STANDBY

8003		
1001	JD01	
1	1	DGND
2	2	384 Fs
3	3	DGND
4	4	SEL_PCM/DSD_LFE
5	5	DGND
6	6	DATA_CL/DSD_CENTER
7	7	DGND
8	8	SEL_PCM/DSD_Rs
9	9	DGND
10	10	DATA_LsRs/DSD_Ls
11	11	DGND
12	12	SEL_PCM/DSDRIGHT
13	13	DGND
14	14	DATALR/DSDLEFT
15	15	DGND
16	16	WORDCLK/SEL_DSD
17	17	DGND
18	18	BITCLK/DSDCLK
19	19	DGND
20	20	256Fs
21	21	DGND
22	22	SCL_DAC
23	23	SDA_DAC
24	24	STB_OUT

8004	
1	SCL
2	GND
3	SDA
4	STB_CONT
5	N.C.

8005	
1	+12V
2	GND
3	+5Vstb
4	-40V
5	on/offA
6	on/offB

8006	
1	P50
2	B
3	G
4	GND
5	R
6	CVBS
7	GND
8	0/6/12V
9	-8Vstby
10	+5V
11	+5V
12	KILL
13	GND
14	PCM_OUT0
15	LRCLK
16	SCLK
17	GND
18	PCM_CLK
19	CENTER
20	STEREO MUTE
21	DIG OUT
22	GND

8007	
1	GND
2	HSYNC
3	GND
4	PCM_OUT2
5	GND
6	PCM_OUT1
7	NC
8	SCL
9	12Vstby
10	SDA
11	+6Vstby
12	NC
13	GND
14	Cr
15	GND
16	Y

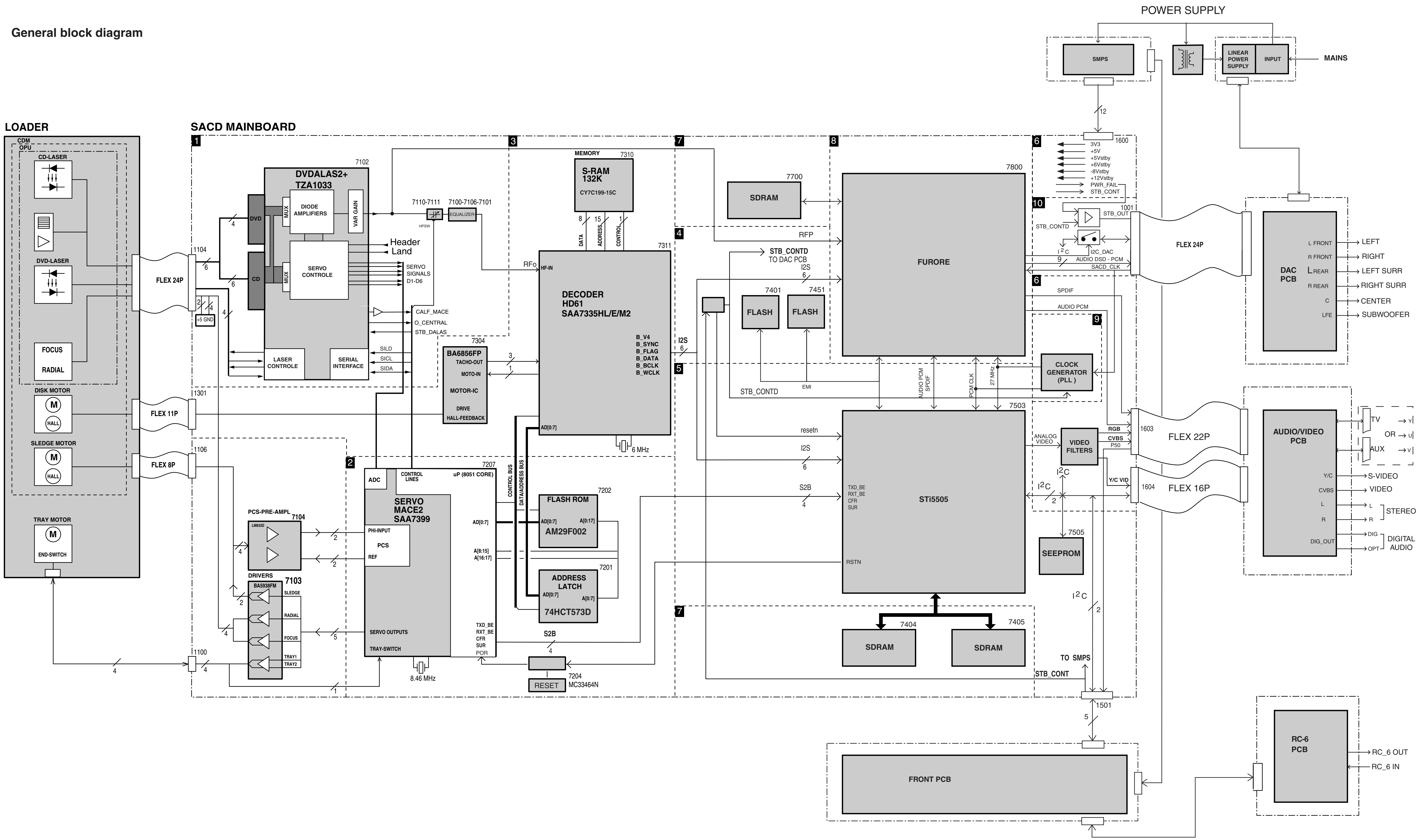
WY04	
1	+5Vstb
2	GND
3	RC_IN
4	RC_OUT

WY03	
1	LED_A
2	LED_B
3	on/offA
4	on/offB

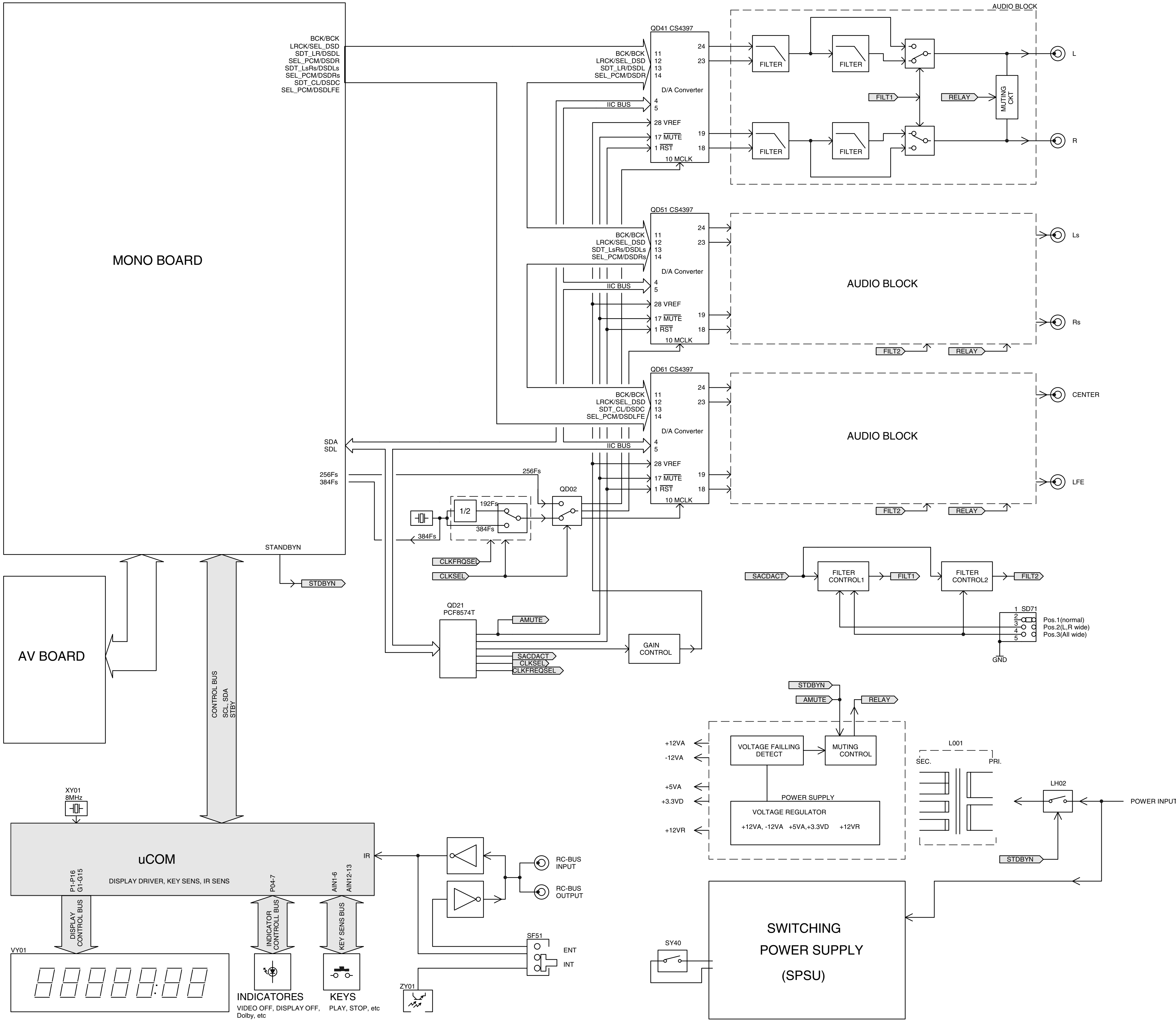
WN92 (N only)	
1	+12Vstb
2	+5V
3	kill

CL 06532152_052.eps
121200

General block diagram

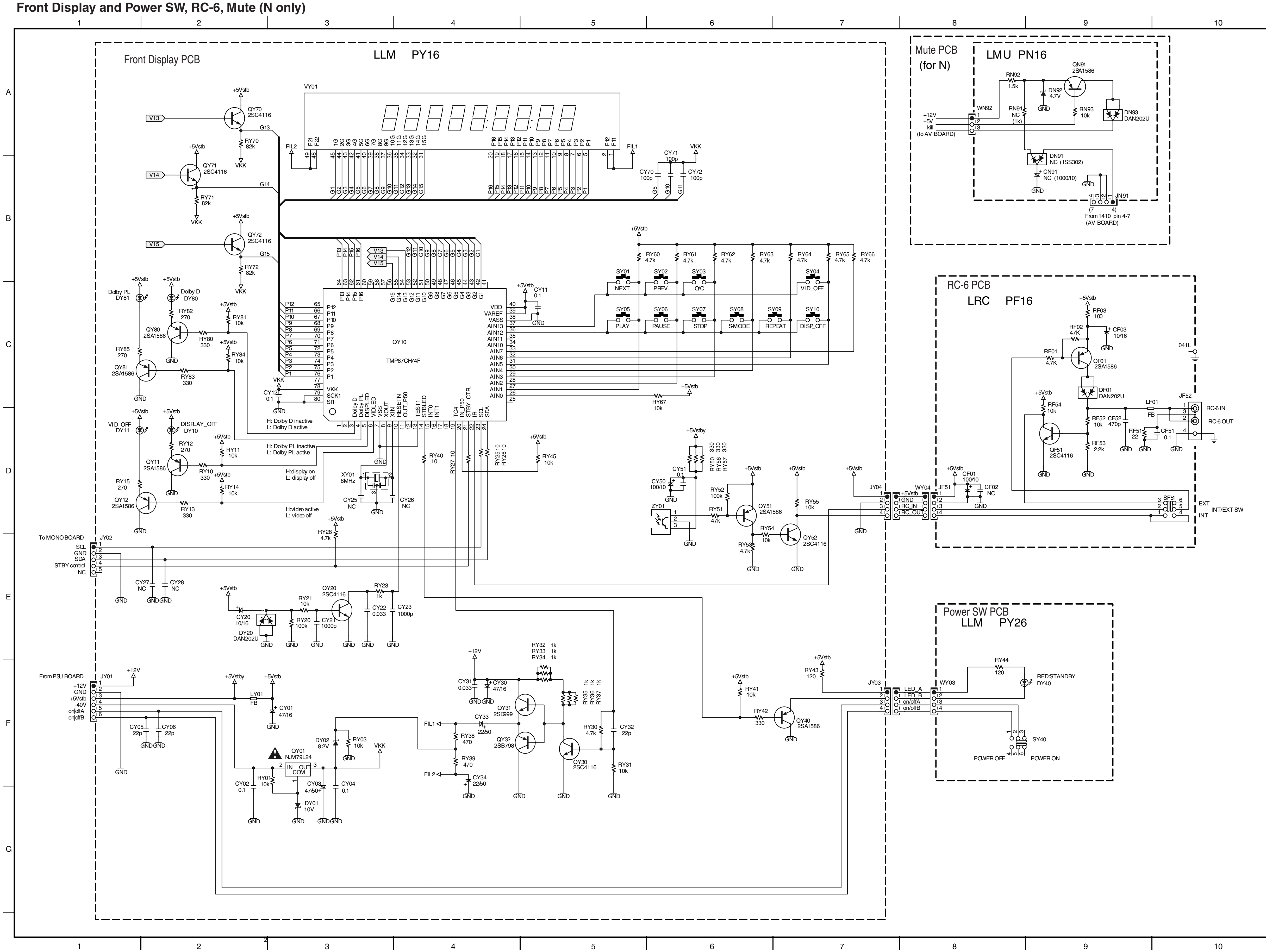


Block diagram DAC PCB



7. Schematic diagram and Parts loocation

Front Display and Power SW, RC-6, Mute (N only)



Part	Location
CF01	D8
CF02	D8
CF03	C9
CF51	D10
CF52	D9
CY01	F3
CY02	G2
CY03	G3
CY04	G3
CY05	F2
CY06	F2
CY11	C5
CY12	C3
CY20	E2
CY21	E3
CY22	E3
CY23	E3
CY25	D3
CY26	D3
CY27	E2
CY28	E2
CY30	F4
CY31	F4
CY32	F5
CY33	F4
CY34	F4
CY50	D6
CY51	D6
CY70	B6
CY71	B6
CY72	B6
DF01	C9
DN91	B9
DN92	A9
DN93	A9
DY01	D1
DY01	G3
DY02	F3
DY10	D2
DY20	E2
DY40	F8
DY80	C2
DY81	C1
JF51	D8
JF52	D10
JN91	B9
JY01	F1
JY02	E1
JY03	F7
JY04	D7
LF01	D9
LY01	F2
QF01	C9
QF51	D9
QN91	A9
QY01	F3
QY10	C4
QY11	D2
QY12	D1
QY20	E3
QY30	F5
QY31	F5
QY32	F5
QY40	F7
QY51	D6
QY52	E7
QY70	A2
QY71	B2
QY72	B2
QY80	C2
QY81	C1
RF01	C9
RF02	C9
RF03	C9
RF51	D9
RF52	D9
RF53	D9
RF54	D9
RN91	A8
RN92	A8
RN93	A9
RY01	F3
RY03	F3
RY11	D2
RY12	D2
RY13	D2
RY14	D2
RY15	D1
RY20	E3
RY21	E3
RY23	E3
RY25	D4
RY26	D4
RY27	D4
RY28	E3
RY30	F5
RY31	F5
RY32	F5
RY33	F5
RY34	F5
RY35	F5
RY36	F5
RY37	F5
RY38	F4
RY39	F4
RY40	D4
RY41	F6
RY42	F6
RY43	F7
RY44	F8
RY45	D5
RY50	D6
RY51	D6
RY52	D6
RY53	E6
RY54	E6
RY55	D7
RY56	D6
RY57	D6
RY60	B5
RY61	B6
RY62	B6
RY63	B6
RY64	B7
RY65	B7
RY66	B7
RY67	C6
RY70	A2
RY71	B2
RY72	B2
RY80	C2
RY81	C2
RY82	C2
RY83	C2
RY84	C2
RY85	C1
SF51	D10
SY01	B5
SY02	B6
SY03	B6
SY04	B7
SY05	C5
SY06	C6
SY07	C6
SY08	C6
SY09	C7
SY10	C7
SY40	F8
VY01	A3
WN92	A8
WY03	F8
XY01	D3
ZY01	D6

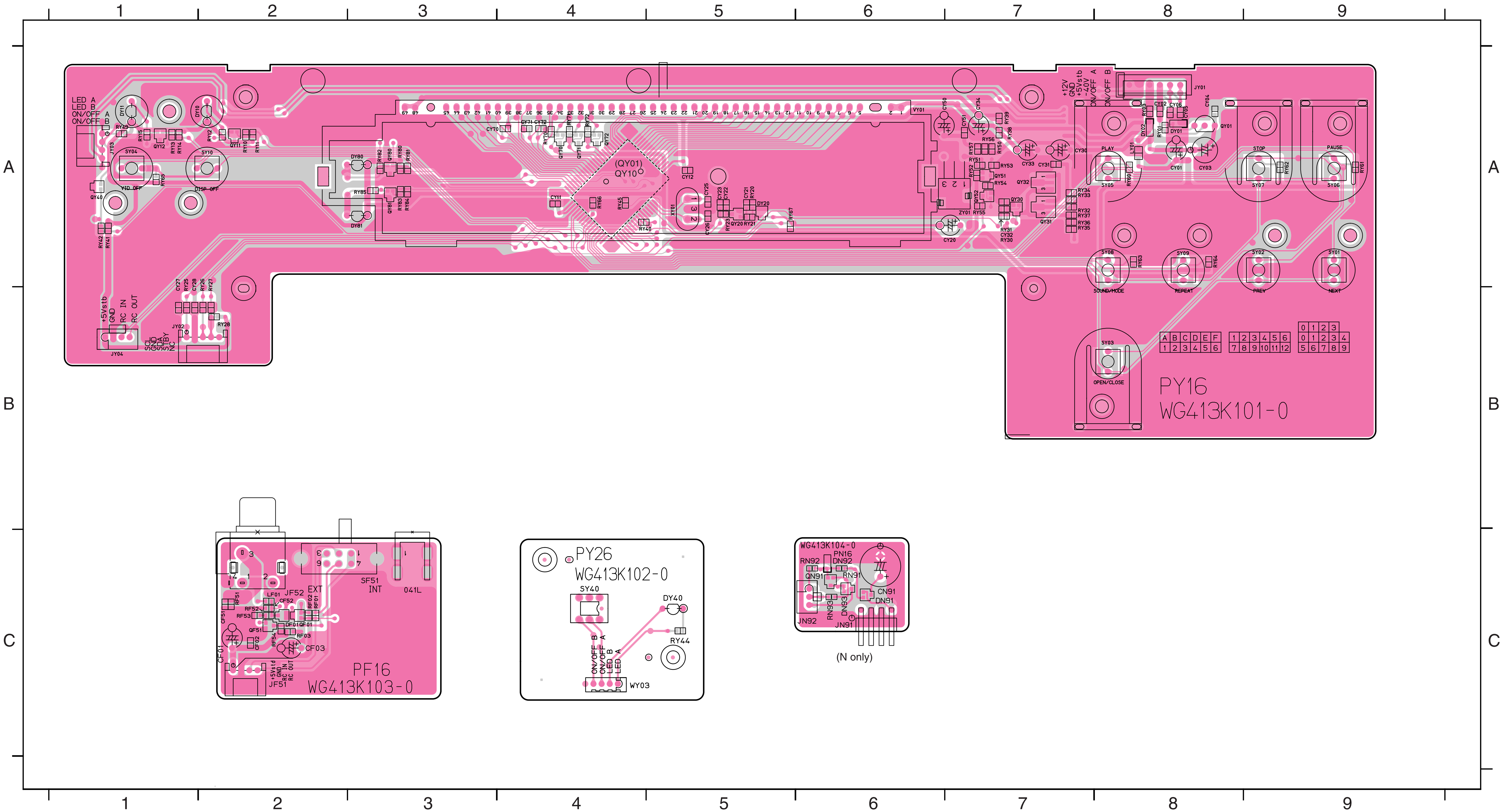
Layout Front Display and Power SW, RC-6, Mute (N only) (bottom view)

Ref	Loc	Ref	Loc	Ref	Loc	Ref	Loc	Ref	Loc	Ref	Loc
CF01B	C21	CY02	A8	CY20	A7	CY28	B1	CY51	A7	DN93	C6
CF02	C2	CY03	A8	CY21	A5	CY30	A7	CY70	A4	DY01	A8
CF03	C2	CY04	A8	CY22	A5	CY31	A7	CY71	A4	DY02	A8
CF51	C2	CY05	A8	CY23	A5	CY32	A7	CY72	A4	DY10	A2
CF52	C2	CY06	A8	CY25	A5	CY33	A7	DF01	C2	DY11	A2
CN91	C6	CY11	A4	CY26	A5	CY34	A7	DN91	C6	DY20	A5
CY01	A8	CY12	A5	CY27	B1	CY50	A7	DN92	C6	DY40	C5

Ref	Loc	Ref	Loc	Ref	Loc	Ref	Loc	Ref	Loc	Ref	Loc
DY80	A3	JY04	B1	QY11	A2	QY51	A7	RF02	C2	RN92	C6
DY81	A3	LY01	A8	QY12	A1	QY52	A7	RF03	C2	RN93	C6
JF52	C2	QF01	C2	QY20	A5	QY70	A4	RF51	C2	RY01	A8
JN91	C6	QF51	C2	QY30	A7	QY71	A4	RF52	C2	RY03	A8
JN92	C6	QN91	C6	QY31	A7	QY72	A4	RF53	C2	RY10	A2
JY02	B2	QY01	A8	QY32	A7	QY81	A3	RF54	C2	RY11	A2
JY03	A1	QY10	A4	QY40	A1	RF01	C2	RN91	C6	RY12	A2

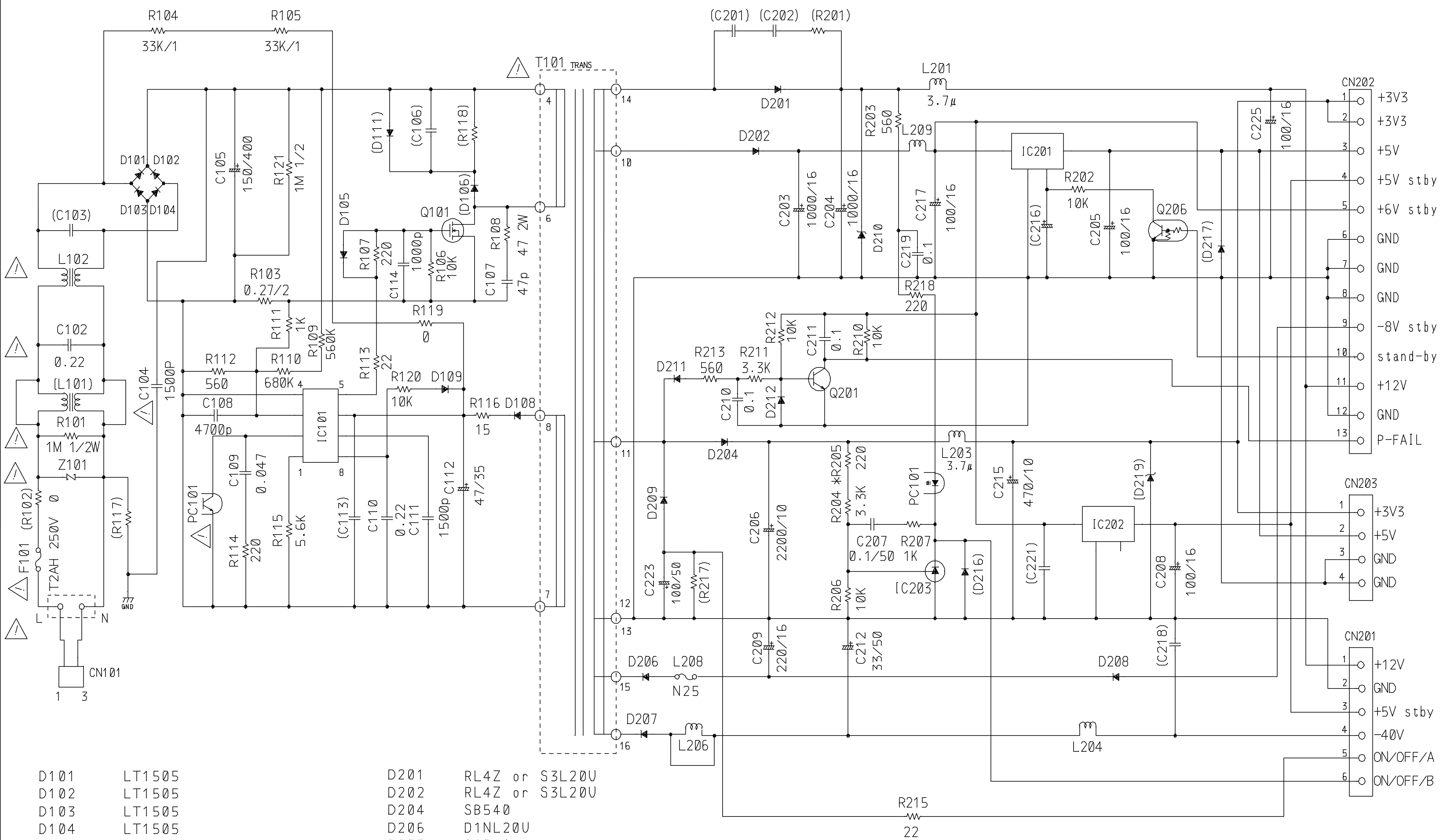
Ref	Loc	Ref	Loc	Ref	Loc	Ref	Loc	Ref	Loc	Ref	Loc
RY13	A1	RY27	B2	RY35	A7	RY42	A1	RY53	A7	RY62	A9
RY14	A1	RY28	B2	RY36	A7	RY43	A1	RY54	A7	RY63	A8
RY15	A1	RY30	A7	RY37	A7	RY44	C5	RY55	A7	RY64	A8
RY20	A5	RY31	A7	RY38	A7	RY45	A4	RY56	A7	RY65	A1
RY21	A5	RY32	A7	RY39	A7	RY50	A7	RY57	A7	RY65	A4
RY25	B1	RY33	A7	RY40	A4	RY51	A7	RY60	A8	RY67	A5
RY26	B2	RY34	A7	RY41	A1	RY52	A7	RY61	A9	RY70	A4

Ref	Loc	Ref	Loc	Ref	Loc	Ref	Loc
RY71	A4	RY84	A3	SY05	A8	VY01	A6
RY72	A4	RY85	A3	SY06	A9	WY03	C4
RY73	A4	SF51	C3	SY07	A9	XY01	A5
RY80	A3	SY01	A9	SY08	A8	ZY01	A7
RY81	A3	SY02	A9	SY09	A8		
RY82	A3	SY03	B8	SY10	A2		
RY83	A3	SY04	A1	SY40	C4		



SWITCHED MODE POWER SUPPLY UNIT (PZ03)

FOR ORIENTATION ONLY



D101	LT1505
D102	LT1505
D103	LT1505
D104	LT1505
D105	ISS133
(D106)	
D108	AU02Z
D109	MA4220 or MTZ22
Q101	2SK2651
IC101	KA7552
PC101	ON3171 or PC123

( ) : no stuff

D201	RL4Z or S3L20U
D202	RL4Z or S3L20U
D204	SB540
D206	D1NL20U
D207	AG01A
D208	LT1505 or 1N4005
D209	AU02Z
D210	P4KA15
D211	1SS133
D212	1SS133
(D217)	
Q201	2SC17400
Q206	DTC114
IC201	PQ05RD08 or PQ05RD11 or KA78R05
IC202	PQ05RD08 or PQ05RD11 or KA78R05
IC203	AN1431T

SACD

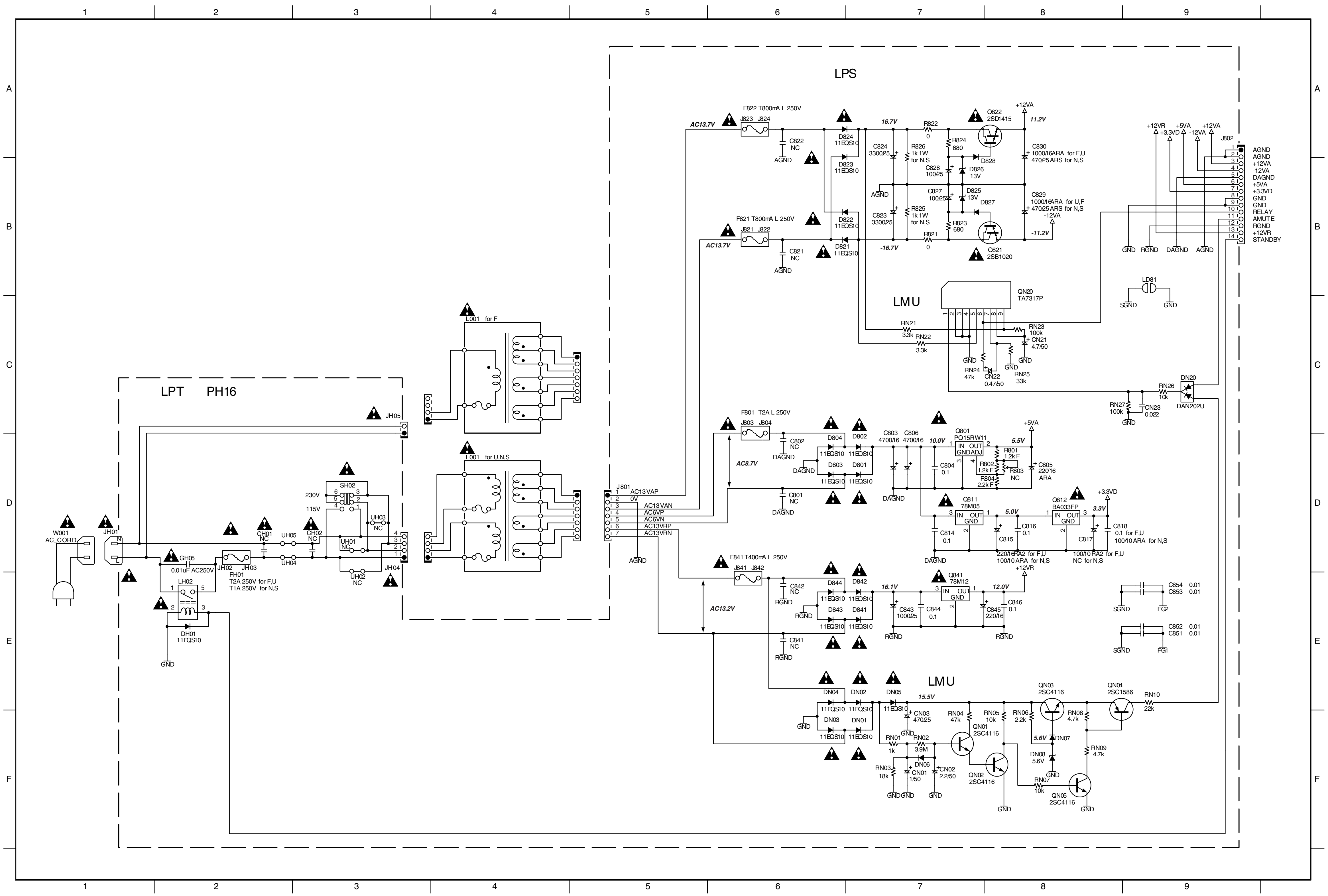
＊ 調整抵抗(Adjustable)

symbol	min	typ	max
＊R205	0	560	1K

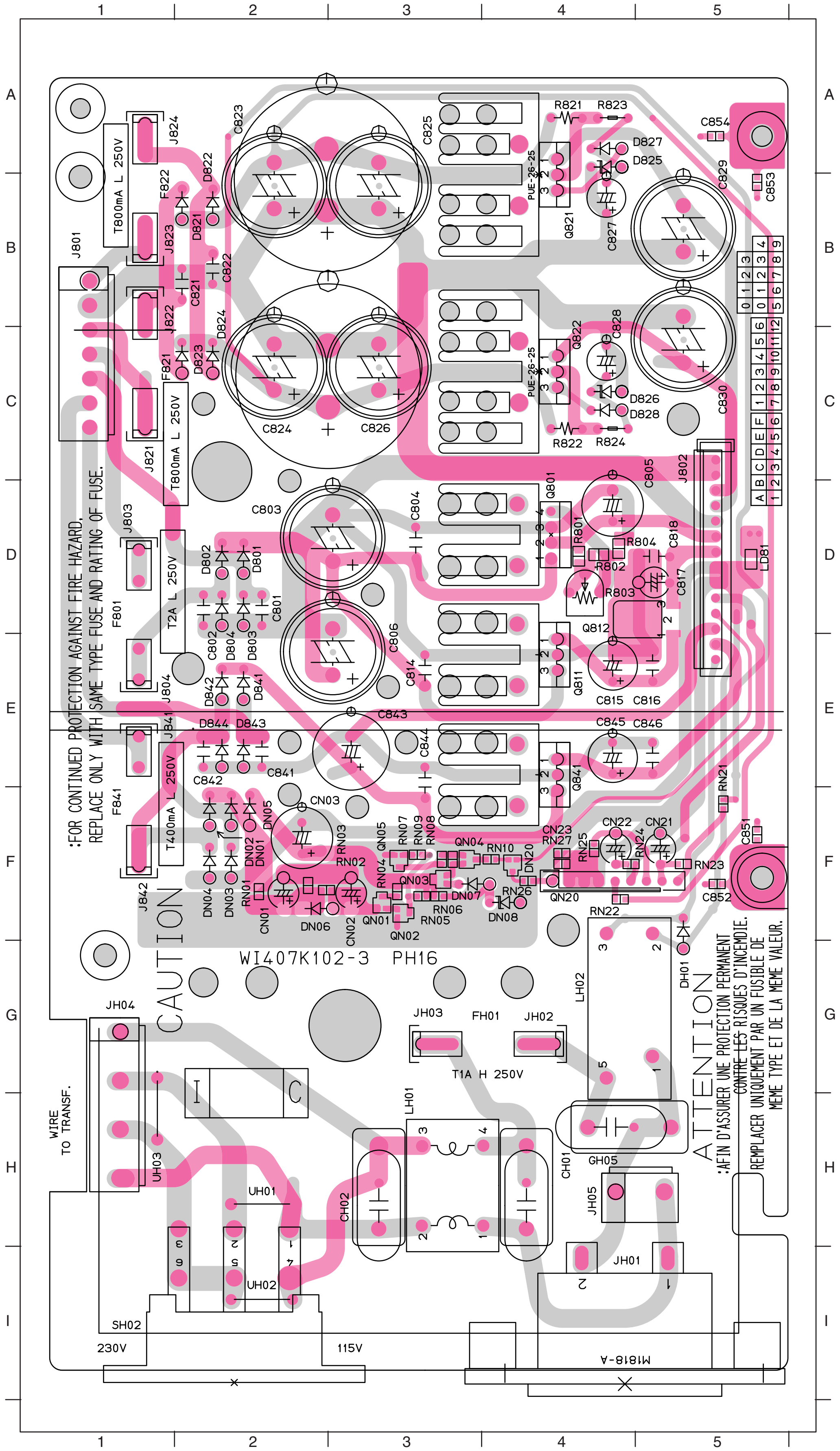
CL 06532152_058.eps
121200

Power supply

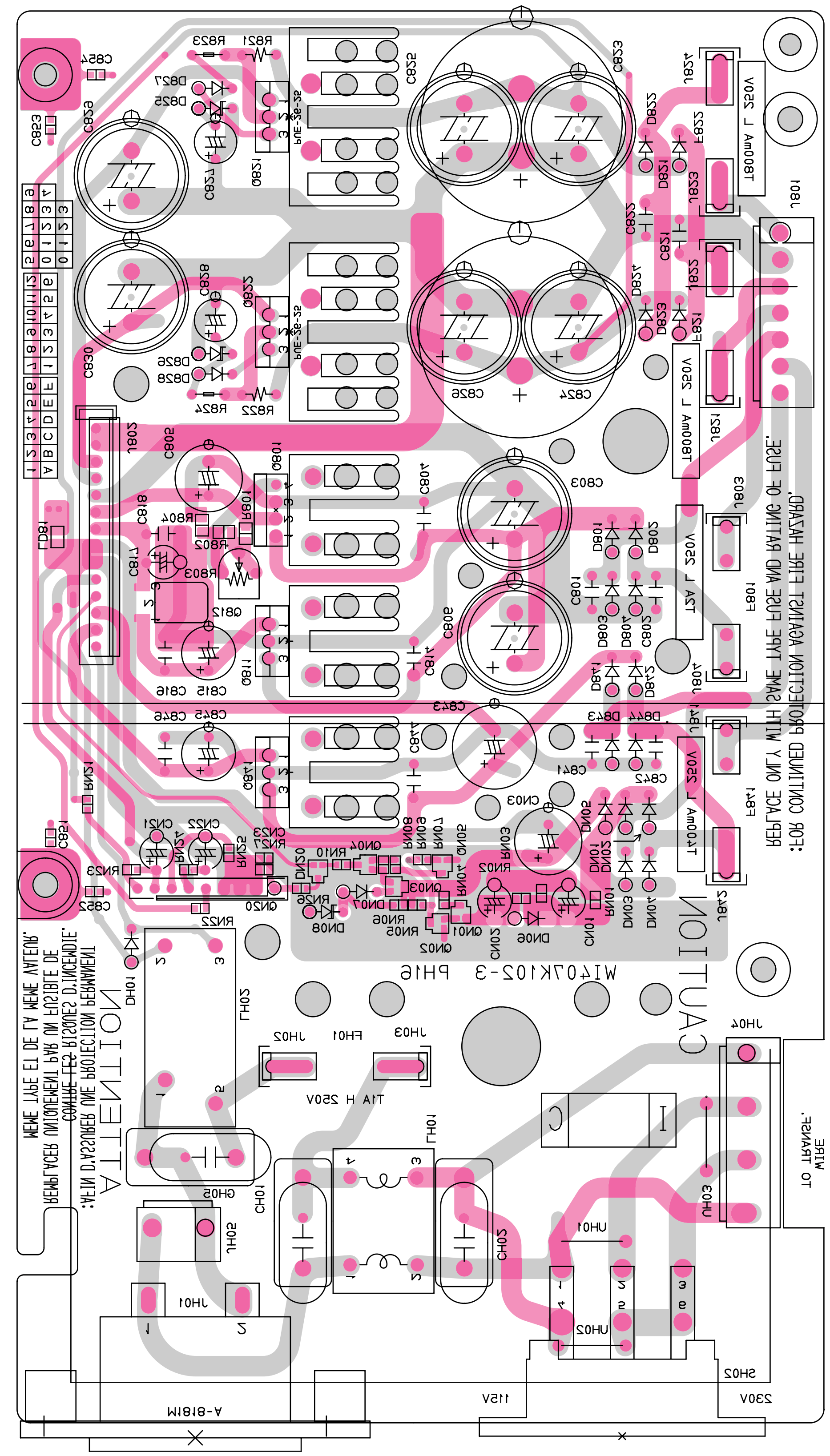
C801	D6	C815	D8	C824	A7	C843	E7	C854	E9	CN22	C8	D822	B6	D841	E7	DN03	E7	F801	D6	JH01	D1	Q801	D7	QN02	F8	R803	D8	R826	A7	RN07	F8	RN24	C7
C802	D6	C816	D8	C827	B7	C844	E7	CH01	D2	CN23	C9	D823	B6	D842	E7	DN03	F6	F821	B6	JH04	D3	Q811	D7	QN03	F8	R804	D8	RN01	F6	RN08	F8	RN25	C8
C803	D7	C817	D8	C828	B7	C845	E8	CH02	D3	D801	D7	D824	A6	D843	E6	DN04	E6	F822	A6	JH05	C3	Q812	D8	QN04	F8	R821	B7	RN02	F6	RN09	F8	RN26	C9
C804	D7	C818	D8	C829	B8	C846	E8	CN01	F6	D802	D7	D825	B7	D844	E6	DN06	F6	F841	E6	L001	C4	Q821	B8	QN05	F8	R822	A7	RN03	F6	RN10	E9	RN27	C9
C805	D8	C821	B6	C830	A8	C851	E9	CN02	F6	D803	D6	D826	B7	DH01	E2	DN07	F8	FH00	D2	L001	D4	Q822	A8	QN20	C7	R823	B7	RN04	F6	RN21	C7	SH02	D3
C806	D7	C822	A6	C841	E6	C852	E9	CN03	F6	D804	D6	D827	B7	DN01	F6	DN08	F8	GH05	D2	LD81	B9	Q841	E7	R801	D8	R824	A7	RN05	F6	RN22	C7	W001	D1
C814	D7	C823	B7	C842	E6	C853	E9	CN21	C8	D821	B6	D828	B7	DN02	E7	DN20	C9	J801	D5	LH02	E2	QN01	F6	R802	D8	R825	B7	RN06	F8	RN23	C8		



Layout Power supply Board

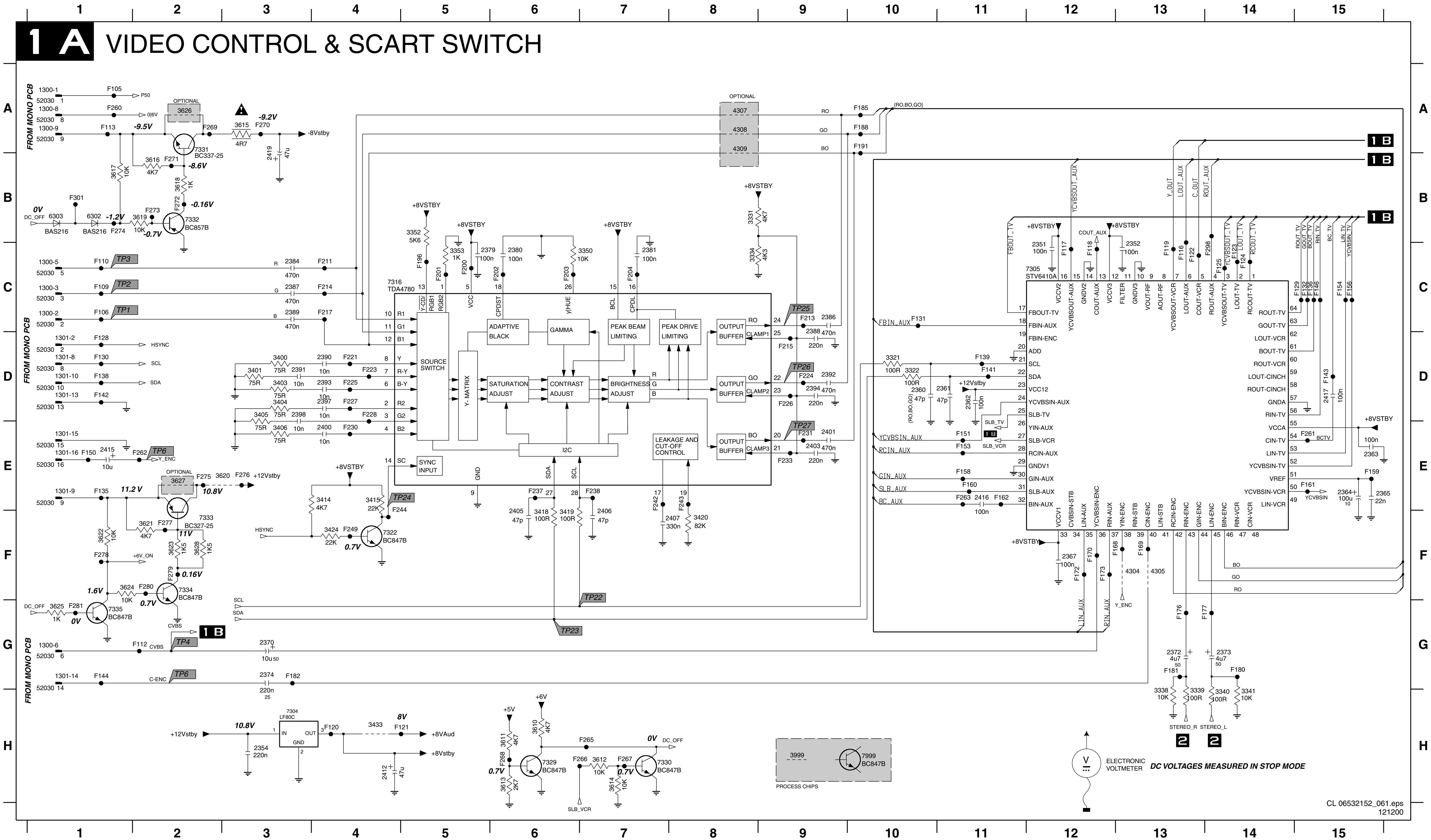


Ref	Location	Ref	Location
CN01	F2	RN01	F2
CN02	F3	RN02	F3
CN03	F2	RN03	F3
CN21	F5	RN04	F3
CN22	F4	RN05	F3
CN23	F4	RN06	F3
CH01	H4	RN07	F3
CH02	H3	RN08	F3
C801	D2	RN09	F3
C802	E2	RN10	F4
C803	D2	RN21	F5
C804	D3	RN22	F4
C805	D5	RN23	F5
C806	E3	RN24	F5
C814	E3	RN25	F4
C815	E4	RN26	F4
C816	E5	RN27	F4
C817	D5	R801	D4
C818	D5	R802	D4
C821	B2	R803	D4
C822	B2	R804	D4
C823	A2	R821	A4
C824	C2	R822	C4
C825	A3	R823	A4
C826	C3	R824	C4
C827	B4	SH02	I1
C828	C4	UH01	H2
C829	B5	UH02	I2
C830	C5	UH03	H1
C841	E2		
C842	E2		
C843	E3		
C844	E3		
C845	E4		
C846	E5		
C851	F5		
C852	F5		
C853	B5		
C854	A5		
DN01	F2		
DN02	F2		
DN03	F2		
DN04	F2		
DN05	F2		
DN06	F3		
DN07	F3		
DN08	F4		
DN20	F4		
DH01	G5		
D801	D2		
D802	D2		
D803	E2		
D804	E2		
D821	B2		
D822	B2		
D823	C2		
D824	C2		
D825	A4		
D826	C4		
D827	A4		
D828	C4		
D841	E2		
D842	E2		
D843	E2		
D844	E2		
FH01	G3		
F801	D1		
F821	C1		
F822	B1		
F841	F1		
GH05	H4		
JH01	I4		
JH02	G4		
JH03	G3		
JH04	G1		
JH05	H4		
J801	B1		
J802	C5		
J803	D1		
J804	E1		
J821	C1		
J822	B2		
J823	B2		
J824	A1		
J841	E1		
J842	F1		
LH01	H3		
LH02	G4		
LD81	D5		
QN01	F3		
QN02	F3		
QN03	F3		
QN04	F3		
QN05	F3		
QN20	F4		
Q801	D4		
Q811	E4		
Q812	D4		
Q821	B4		
Q822	C4		
Q841	E4		

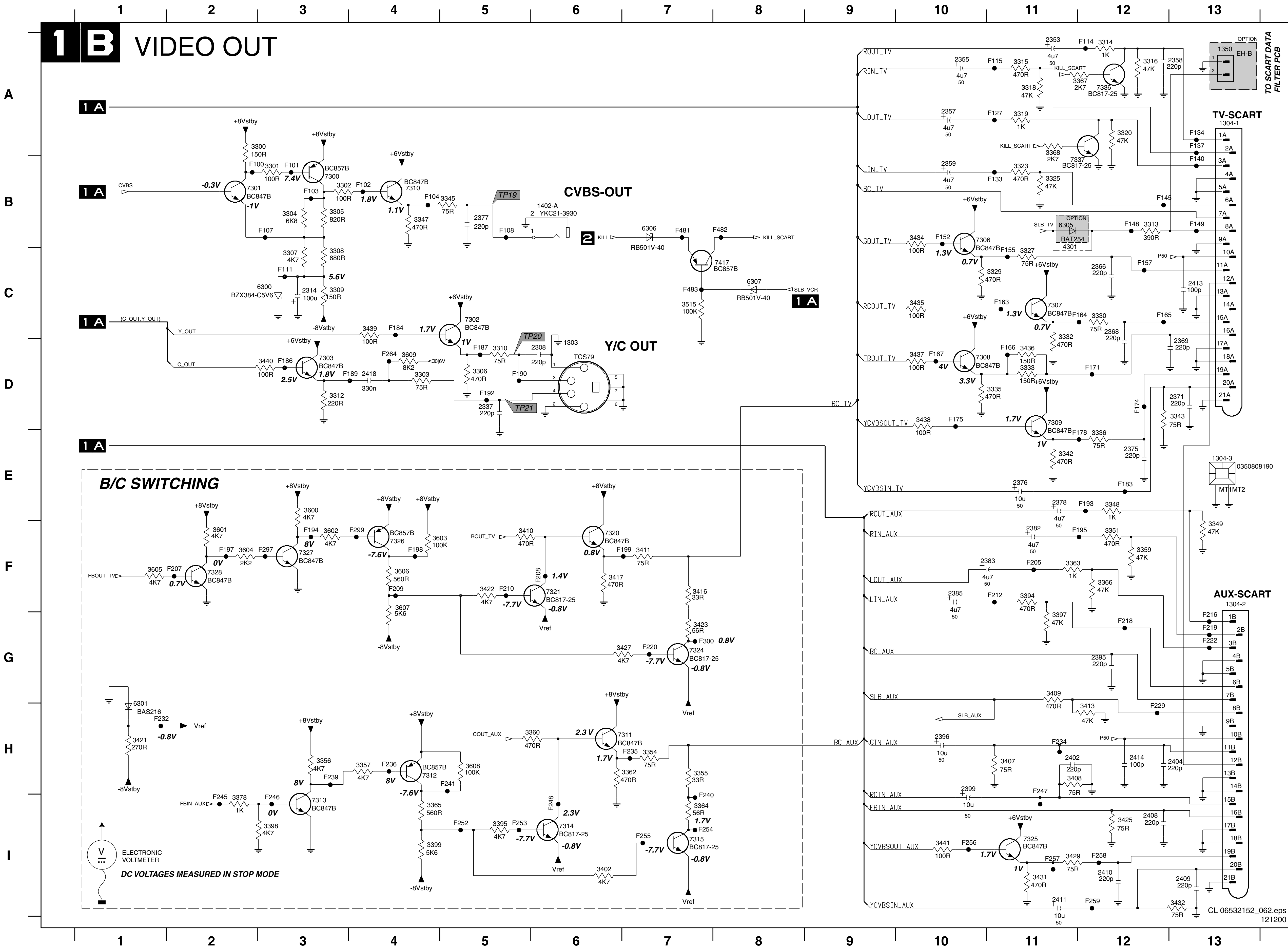


AV Board (N:Europe) : Video control & SCART switch

1300-1 A1	1301-14 G1	2360 D10	2373 G14	2389 C3	2401 E9	2419 B3	3350 C7	3414 E4	3612 H7	3621 F2	4304 F13	7316 C4	7999 H10	F118 C12	F129 C15	F142 D1	F158 E11	F173 F12	F196 C5	F215 D9	F230 E4	F260 A1	F270 A3	F279 F2
1300-2 C1	1301-15 E1	2361 D11	2374 G3	2390 D4	2403 E9	3321 D10	3352 B5	3415 E4	3613 H6	3622 F1	4305 F13	7322 F4	F105 A1	F119 C13	F130 D1	F143 D15	F159 E15	F176 G13	F200 C5	F217 C4	F231 E9	F261 E15	F271 B2	F280 F2
1300-3 C1	1301-16 E1	2362 D11	2379 C5	2391 D3	2405 F6	3322 D10	3353 C5	3418 F6	3614 H7	3623 F2	4307 A8	7329 H6	F106 C1	F120 H4	F131 C10	F144 G1	F160 E11	F177 G14	F201 C5	F221 D4	F233 E9	F262 E2	F272 B2	F281 G1
1300-5 C1	1301-2 D1	2363 E15	2380 C6	2392 D9	2406 F7	3331 B8	3400 D3	3419 F6	3615 A3	3624 F1	4308 A8	7330 H7	F109 C1	F121 H5	F132 C15	F146 C15	F161 E15	F180 G14	F202 C6	F223 D4	F237 E6	F263 E11	F273 B2	F298 C14
1300-6 G1	1301-8 D1	2364 E15	2381 C7	2393 D4	2407 F8	3334 C8	3401 D3	3420 F8	3616 B2	3625 G1	4309 A8	7331 A2	F110 C1	F122 C13	F135 E1	F150 E1	F162 E11	F181 G13	F203 C6	F224 D9	F238 E7	F265 H7	F274 B1	F301 B1
1300-8 A1	1301-9 E1	2365 E15	2384 C3	2394 D9	2412 H4	3338 H13	3403 D3	3424 F4	3617 B1	3626 A2	6302 B1	7332 B2	F112 G2	F123 C14	F136 C15	F151 E11	F168 F13	F182 G3	F204 C7	F225 D4	F242 E7	F266 H7	F275 E2	
1300-9 A1	2351 C12	2367 F12	2386 C9	2397 D4	2415 E1	3339 H13	3404 D3	3433 H4	3618 B2	3627 E2	6303 B1	7333 F2	F113 A1	F124 C14	F138 D1	F153 E11	F169 F13	F185 A10	F211 C4	F226 D9	F243 E8	F267 H7	F276 E3	
1301-10 D1	2352 C13	2370 G3	2387 C3	2398 D3	2416 E11	3340 H14	3405 D3	3610 H6	3619 B2	3628 F2	7304 H3	7334 F2	F116 C13	F125 C14	F139 D11	F154 C15	F170 F12	F188 A10	F213 C9	F227 D4	F244 F4	F268 H6	F277 F2	
1301-13 D1	2354 H3	2372 G13	2388 D9	2400 E4	2417 D15	3341 H14	3406 E3	3611 H6	3620 E3	3999 H9	7305 C11	7335 G1	F117 C12	F128 D1	F141 D11	F156 C15	F172 F12	F191 A10	F214 C4	F228 D4	F249 F4	F269 A2	F278 F1	

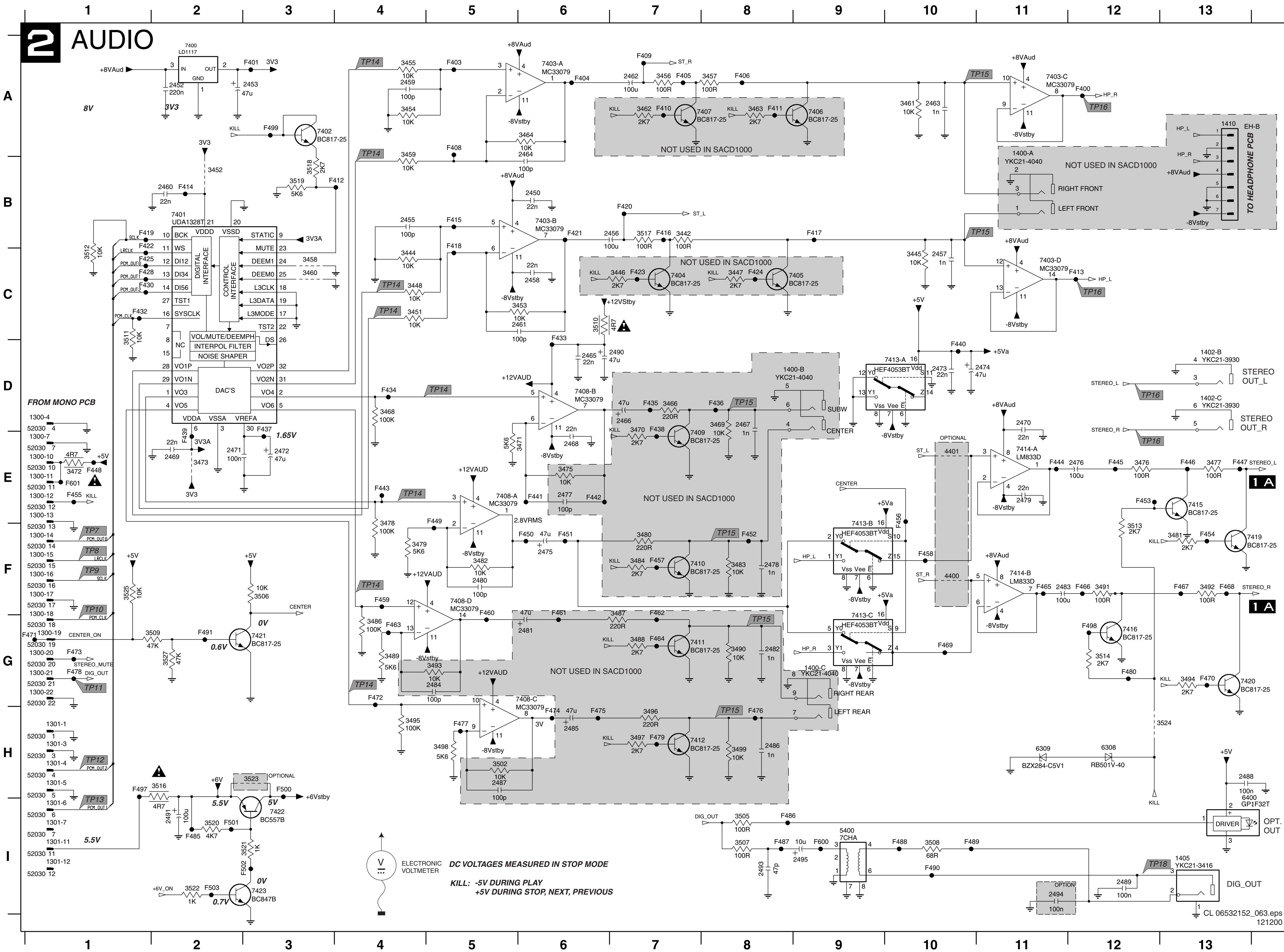


AV Board (N:Europe) :Video out



Ref	Pos	Ref	Pos
1303	D6	3602	F3
1304-1	A13	3603	F4
1304-2	F13	3604	F2
1304-3	E13	3605	F1
1350	A13	3606	F4
1402-A	B6	3607	F4
2308	D6	3608	H5
2314	C3	3609	D4
2337	D5	4301	C11
2353	A11	6300	C3
2355	A10	6301	H1
2357	A10	6305	B11
2358	A13	6306	B7
2359	B10	6307	C8
2366	C12	7300	B3
2368	C12	7301	B2
2369	C13	7302	C5
2371	D13	7303	D3
2375	E12	7306	B10
2376	E11	7307	C11
2377	B5	7308	D10
2378	E11	7309	D11
2382	F11	7310	B4
2383	F11	7311	H6
2385	F10	7312	H4
2395	G12	7313	I3
2396	H10	7314	I6
2399	H10	7315	I7
2402	H11	7320	F6
2404	H13	7321	F6
2408	I12	7324	G7
2409	I13	7325	I11
2410	I12	7326	F4
2411	I11	7327	F3
2413	C13	7328	F2
2414	H12	7336	A12
2418	D4	7337	B11
3300	A3	7417	C8
3301	B3	F100	B2
3302	B3	F101	B3
3303	D4	F102	B4
3304	B3	F103	B3
3305	B3	F104	B4
3306	D5	F107	B3
3307	C3	F108	B5
3308	C3	F111	C3
3309	C3	F114	A12
3310	D5	F115	A11
3312	D3	F127	A11
3313	B12	F133	B11
3314	A12	F134	A13
3315	A11	F137	A13
3316	A12	F140	B13
3318	A11	F145	B12
3319	A11	F148	B12
3320	A12	F149	B13
3323	B11	F152	B10
3325	B11	F155	C11
3327	C11	F157	C12
3329	C11	F163	C11
3330	C12	F164	C12
3332	D11	F165	C12
3333	D11	F166	D11
3335	D11	F167	D10
3336	E12	F171	D12
3342	E11	F174	D12
3343	D13	F175	D10
3345	B5	F178	E12
3347	B4	F183	E12
3348	E12	F184	C4
3349	F13	F186	D3
3351	F12	F187	D5
3354	H7	F189	D4
3355	H7	F190	D5
3356	H3	F192	D5
3357	H4	F193	E12
3359	F12	F194	F3
3360	H6	F195	F12
3362	H7	F197	F2
3363	F11	F198	F4
3364	I7	F199	F7
3365	I4	F205	F11
3366	F12	F207	F2
3367	A12	F208	F6
3368	A11	F209	F4
3378	I2	F210	F5
3394	F11	F212	F11
3395	I5	F216	G13
3397	G11	F218	G12
3398	I3	F219	G13
3399	I4	F220	G7
3402	I6	F222	G13
3407	H11	F229	H12
3408	H11	F232	H1
3409	G11	F234	H11
3410	F5	F235	H7
3411	F7	F236	H4
3413	H12	F239	H3
3416	F7	F240	H7
3417	F6	F241	H5
3421	H1	F245	I2
3422	F5	F246	I3
3423	G7	F247	I11
3425	I12	F248	I6
3427	G7	F252	I5
3429	I11	F253	I5
3431	I11	F254	I7
3432	I13	F255	I7
3434	B10	F256	I10
3435	C10	F257	I11
3436	D11	F258	I12
3437	D10	F259	I12
3438	D10	F264	D4
3439	C4	F297	F3
3440	D3	F299	F4
3441	I10	F300	G7
3515	C7	F481	B7
3600	E3	F482	B8
3601	F2	F483	C7

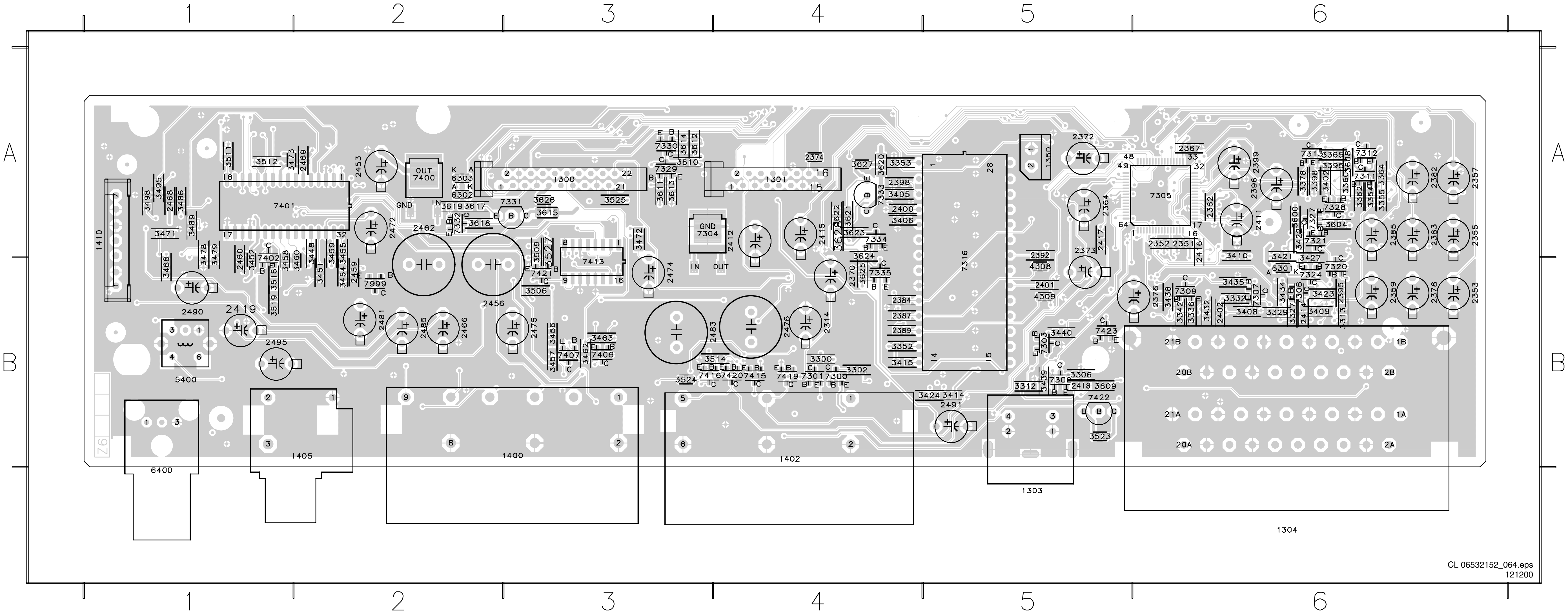
AV Board (N:Europe) : Audio



1300-10 E1
1300-11 E1
1300-12 E1
1300-13 E1
1300-14 F1
1300-15 F1
1300-16 F1
1300-17 F1
1300-18 G1
1300-19 G1
1300-20 G1
1300-21 G1
1300-22 G1
1300-4 D1
1300-7 E1
1301-1 H1
1301-11 I1
1301-12 I1
1301-3 H1
1301-4 H1
1301-5 H1
1301-6 I1
1301-7 I1
1400-A A11
1400-B D9
1400-C G9
1402-B D13
1402-C D13
1405 I13
1410 A13
2450 B6
2452 A2
2453 A3
2455 B4
2456 B7
2457 C10
2458 C6
2459 A4
2460 B2
2461 C6
2462 A7
2463 A10
2464 A6
2465 D6
2466 D7
2467 D8
2468 E6
2469 E2
2470 D11
2471 E2
2472 E3
2473 D10
2474 D11
2475 F6
2476 E12
2477 E6
2478 F8
2479 E11
2480 F5
2481 G6
2482 G8
2483 F11
2484 G5
2485 H6
2486 H8
2487 H5
2488 H13
2489 I12
2490 D7
2491 I2
2493 I8
2494 I11
2495 I9
3442 B7
3444 C4
3445 C10
3446 C7
3447 C8
3448 C4
3451 C4
3452 B2
3453 C6
3454 A4
3455 A4
3456 A7
3457 A8
3458 C3
3459 B4
3460 C3
3461 A10
3462 A7
3463 A8
3464 A6
3466 D7
3468 D4
3469 D8
3470 E7
3471 E5
3472 E1
3473 E2
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3493 G5
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3497 H7
3498 H5
3499 H8
3502 H5
3505 I8
3506 F3
3507 I8
3508 I10
3509 G2
3510 C6
3511 C1
3512 C1
3513 F12
3514 G12
3516 H2
3517 B7
3518 B3
3519 B3
3520 I2
3521 I3
3522 I2
3523 H3
3524 H13
3525 F1
3527 G2
4400 F10
4401 E10
5400 I9
6308 H12
6309 H11
6400 I13
7400 A2
7401 B2
7402 A3
7403-A A6
7403-B B6
7403-C A11
7403-D C11
7404 C7
7405 C8
7406 A9
7407 A7
7408-A E5
7408-B D6
7408-C G5
7408-D F5
7409 E7
7410 F7
7411 G7
7412 H7
7413-A D10
7413-B F9
7413-C G9
7414-A E11
7414-B F11
7415 E13
7416 G12
7419 F13
7420 G13
7421 G3
7422 I3
7423 I3
F400 A12
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F412 B4
F413 C12
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F475 H6
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F490 I10
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F601 E1

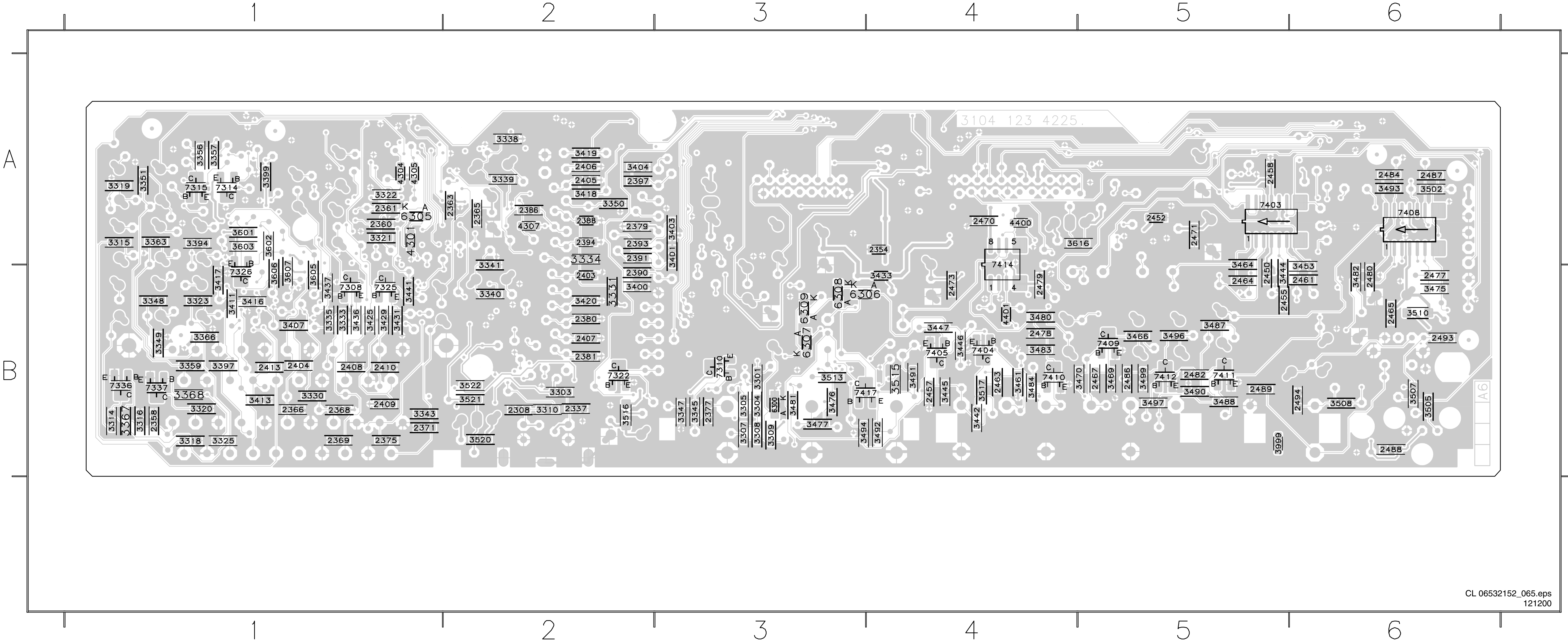
Layout AV Board (N:Europe) (top view)

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1301 A4	2353 B6	2376 B5	2398 A4	2418 B5	2474 B3	3306 B5	3355 A6	3408 B6	3434 B6	3457 B3	3479 A1	3519 B1	3612 A3	3624 A4	6400 B1	7312 A6	7332 A2	7416 B3
1303 B5	2355 B6	2378 B6	2399 A6	2419 B1	2475 B2	3312 B5	3360 A6	3409 B6	3435 B6	3458 B1	3486 A1	3523 B5	3613 A3	3625 B4	7300 B4	7313 A6	7333 A4	7419 B4
1304 B6	2357 A6	2382 A6	2400 A4	2453 A2	2476 B4	3313 B6	3362 A6	3410 B6	3438 B6	3459 B2	3489 A1	3524 B3	3614 A3	3626 A3	7301 B4	7316 A5	7334 A4	7420 B4
1350 A5	2359 B6	2383 B6	2401 B5	2456 B3	2481 B2	3327 B6	3364 A6	3414 B5	3439 B5	3460 B1	3495 A1	3525 A3	3615 A3	3627 A4	7302 B5	7320 B6	7335 B4	7421 B3
1400 B2	2362 A6	2384 B4	2402 B6	2459 B2	2483 B3	3329 B6	3365 A6	3415 B4	3440 B5	3462 B3	3498 A1	3527 A3	3617 A2	3628 A4	7303 B5	7321 A6	7400 A2	7422 B5
1402 B4	2364 A5	2385 A6	2411 A6	2460 B1	2485 B2	3332 B6	3378 A6	3421 B6	3448 A2	3463 B3	3506 B3	3600 A6	3618 A2	4308 A5	7304 B3	7324 B6	7401 A1	7423 B5
1405 B2	2367 A6	2387 B4	2412 A4	2462 B2	2490 B1	3336 B6	3395 A6	3422 A6	3451 B2	3468 B1	3509 A3	3604 A6	3619 A2	4309 B5	7305 A6	7327 A6	7402 B1	7999 B2
1410 A1	2370 B4	2389 B4	2414 B6	2466 B2	2491 B5	3342 B6	3398 A6	3423 B6	3452 B1	3471 A1	3511 A1	3608 A6	3620 A4	5400 B1	7306 B6	7328 A6	7406 B3	
2314 B4	2372 A5	2392 A5	2415 A4	2468 A1	2495 B2	3352 B4	3402 A6	3424 B4	3454 B2	3472 A3	3512 A1	3609 B5	3621 A4	6301 B6	7307 B6	7329 A3	7407 B3	
2351 B6	2373 B5	2395 B6	2416 B6	2469 A1	3300 B4	3353 A4	3405 A4	3427 A6	3455 A2	3473 A1	3514 B4	3610 A3	3622 A4	6302 A2	7309 B6	7330 A3	7413 B3	

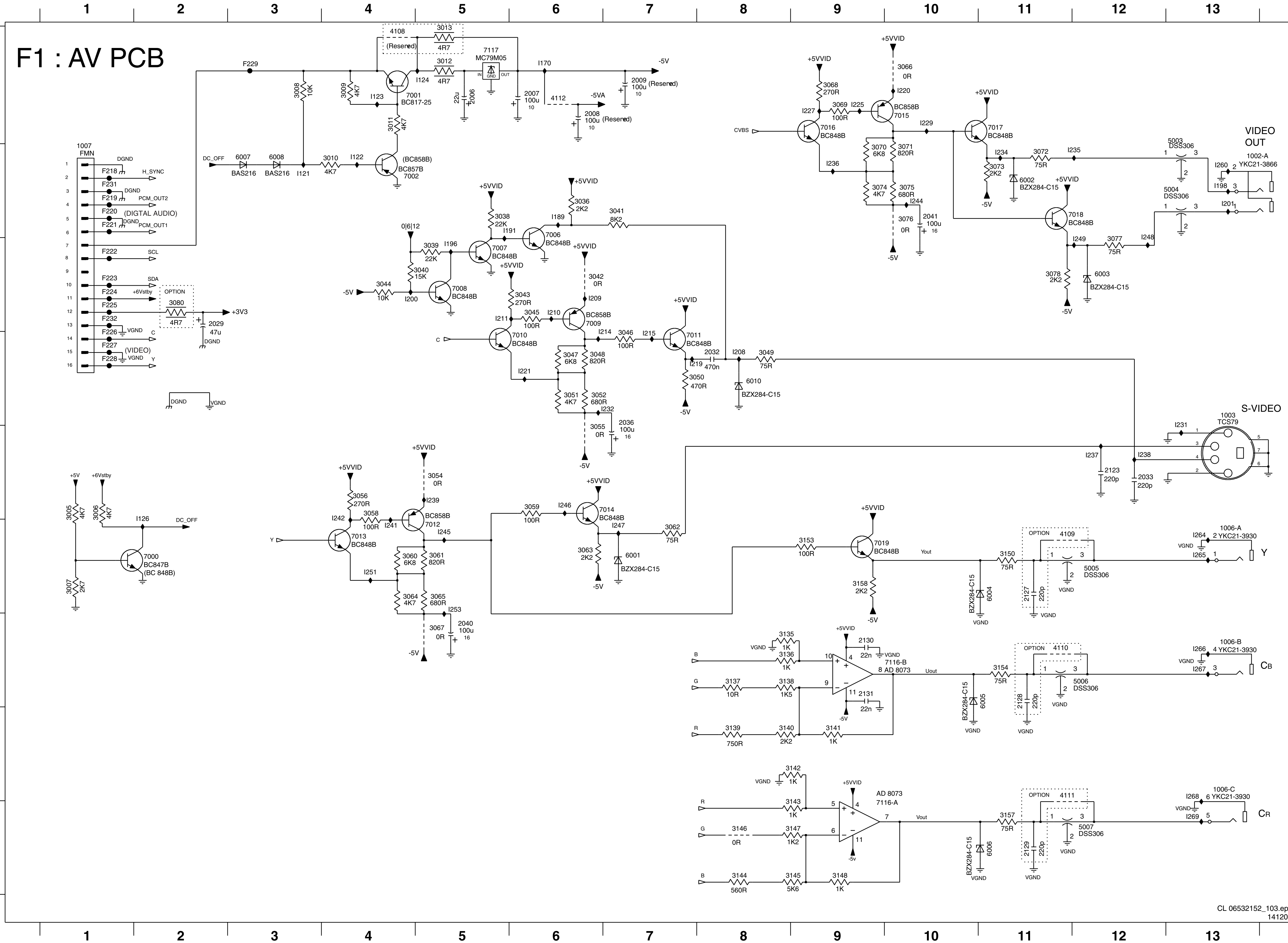


Layout AV Board (N:Europe) (bottom view)

2308 B2	2371 B1	2394 A2	2450 B5	2471 A5	2489 B5	3314 B1	3331 B2	3348 B1	3394 A1	3417 B1	3442 B4	3475 B6	3491 B4	3510 B6	3605 A1	6300 B3	7325 B1	7412 B5
2337 B2	2375 B1	2397 A2	2452 A5	2473 B4	2493 B6	3315 A1	3333 B1	3349 B1	3397 B1	3418 A2	3444 A5	3476 B3	3492 B4	3513 B3	3606 B1	6305 A1	7326 B1	7414 A4
2354 A3	2377 B3	2403 B2	2455 B5	2477 A6	2494 B6	3316 B1	3334 B2	3350 A2	3399 A1	3419 A2	3445 B4	3477 B3	3493 A6	3515 B4	3607 A1	6306 B3	7336 B1	7417 B3
2358 B1	2379 A2	2404 B1	2457 B4	2478 B4	3301 B3	3318 B1	3335 B1	3351 A1	3400 B2	3420 B2	3446 B4	3480 B4	3494 B3	3516 B2	3616 A5	6307 B3	7337 B1	
2360 A1	2380 B2	2405 A2	2458 A5	2479 B4	3303 B2	3319 A1	3338 A2	3356 A1	3401 A3	3425 B1	3447 B4	3481 B3	3496 B5	3517 B4	3999 B6	6308 B3	7403 A5	
2361 A1	2381 B2	2406 A2	2461 B6	2480 A6	3304 B3	3320 B1	3339 A2	3357 A1	3403 A3	3429 B1	3453 A6	3482 A6	3497 B5	3520 B2	4301 A1	6309 B3	7404 B4	
2363 A1	2386 A2	2407 B2	2463 B4	2482 B5	3305 B3	3321 A1	3340 B2	3359 B1	3404 A2	3431 B1	3461 B4	3483 B4	3499 B5	3521 B2	4304 A1	7308 B1	7405 B4	
2365 A2	2388 A2	2408 B1	2464 B5	2484 A6	3307 B3	3322 A1	3341 B2	3363 A1	3407 B1	3433 B4	3464 B5	3484 B4	3502 A6	3522 B2	4305 A1	7310 B3	7408 A6	
2366 B1	2390 B2	2409 B1	2465 B6	2486 B5	3308 B3	3323 B1	3343 B1	3366 B1	3411 B1	3436 B1	3466 B5	3487 B5	3505 B6	3601 A1	4307 A2	7314 A1	7409 B5	
2368 B1	2391 A2	2410 B1	2467 B5	2487 A6	3309 B3	3325 B1	3345 B3	3367 B1	3413 B1	3437 A1	3469 B5	3488 B5	3507 B6	3602 A1	4400 A4	7315 A1	7410 B4	
2369 B1	2393 A2	2413 B1	2470 A4	2488 B6	3310 B2	3330 B1	3347 B3	3368 B1	3416 B1	3441 B1	3470 B4	3490 B5	3508 B6	3603 A1	4401 B4	7322 B2	7411 B5	

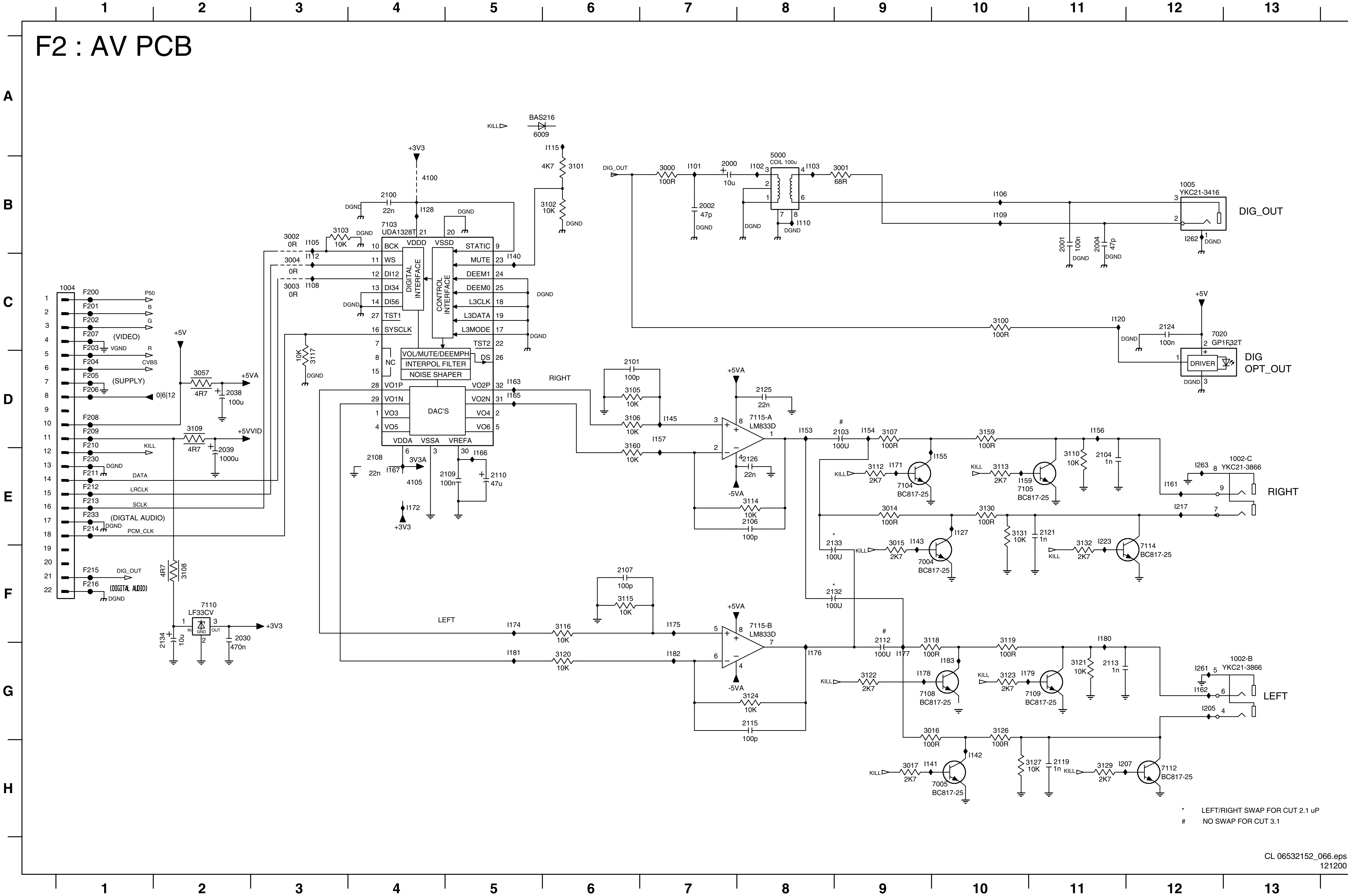


AV Board (F, S, U): Video



1002-A B13
1003 D13
1006-A F13
1006-B G13
1006-C H13
1007 B1
2006 A5
2007 A6
2008 A6
2009 A7
2029 C2
2032 D8
2033 E12
2036 D7
2040 G5
2041 B10
2123 E12
2127 F11
2128 G11
2129 I11
2130 G9
2131 G9
3005 E1
3006 E1
3007 F1
3008 A3
3009 A4
3010 B4
3011 A4
3012 A5
3013 A5
3036 B6
3038 B5
3039 C5
3040 C5
3041 B7
3042 C6
3043 C6
3044 C4
3045 C6
3046 D7
3047 D6
3048 D6
3049 D8
3050 D7
3051 D6
3052 D6
3054 E5
3055 E6
3056 E4
3058 E4
3059 E6
3060 F4
3061 F5
3062 F7
3063 F6
3064 F4
3065 F5
3066 A10
3067 G5
3068 A9
3069 A9
3070 B9
3071 B10
3072 B11
3073 B11
3074 B9
3075 B10
3076 B10
3077 C12
3078 C11
3080 C2
3135 G8
3136 G8
3137 G8
3138 G8
3139 H8
3140 H8
3141 H9
3142 H9
3143 I9
3144 I8
3145 I9
3146 I8
3147 I9
3148 I9
3150 F11
3153 F9
3154 G11
3157 I11
3158 F9
4108 A4
4109 F11
4110 G11
4111 H11
4112 A6
5003 A13
5004 B12
5005 F12
5006 G12
5007 I12
6001 F7
6002 B11
6003 C12
6004 F11
6005 G11
6006 I11
6007 B3
6008 B3
6010 D8
7000 F2
7001 A5
7002 B4
7006 B6
7007 C5
7008 C5
7009 C6
7010 D6
7011 D7
7012 F5
7013 F4
7014 E6
7015 A10
7016 A9
7017 A11
7018 B11
7019 F9
7116-A I9
7116-B G10
7117 A5
F218 B1
F219 B1
F220 B1
F221 B1
F222 C1
F223 C1
F224 C1
F225 C1
F226 D1
F227 D1
F228 D1
F229 A3
F231 B1
F232 C1
I121 B3
I122 B4
I123 A4
I124 A5
I126 E2
I170 A6
I189 B6
I191 B6
I196 C5
I198 B13
I200 C4
I201 B13
I208 D8
I209 C6
I210 C6
I211 C5
I214 D7
I215 D7
I219 D7
I220 A10
I221 D6
I225 A9
I227 A9
I229 A10
I231 D13
I232 D7
I234 B11
I235 B12
I236 B9
I237 E12
I238 E12
I239 E5
I241 F4
I242 E4
I244 B10
I245 F5
I246 E6
I247 F7
I248 B12
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I260 B13
I264 F13
I265 F13
I266 G13
I267 G13
I268 H13
I269 I13

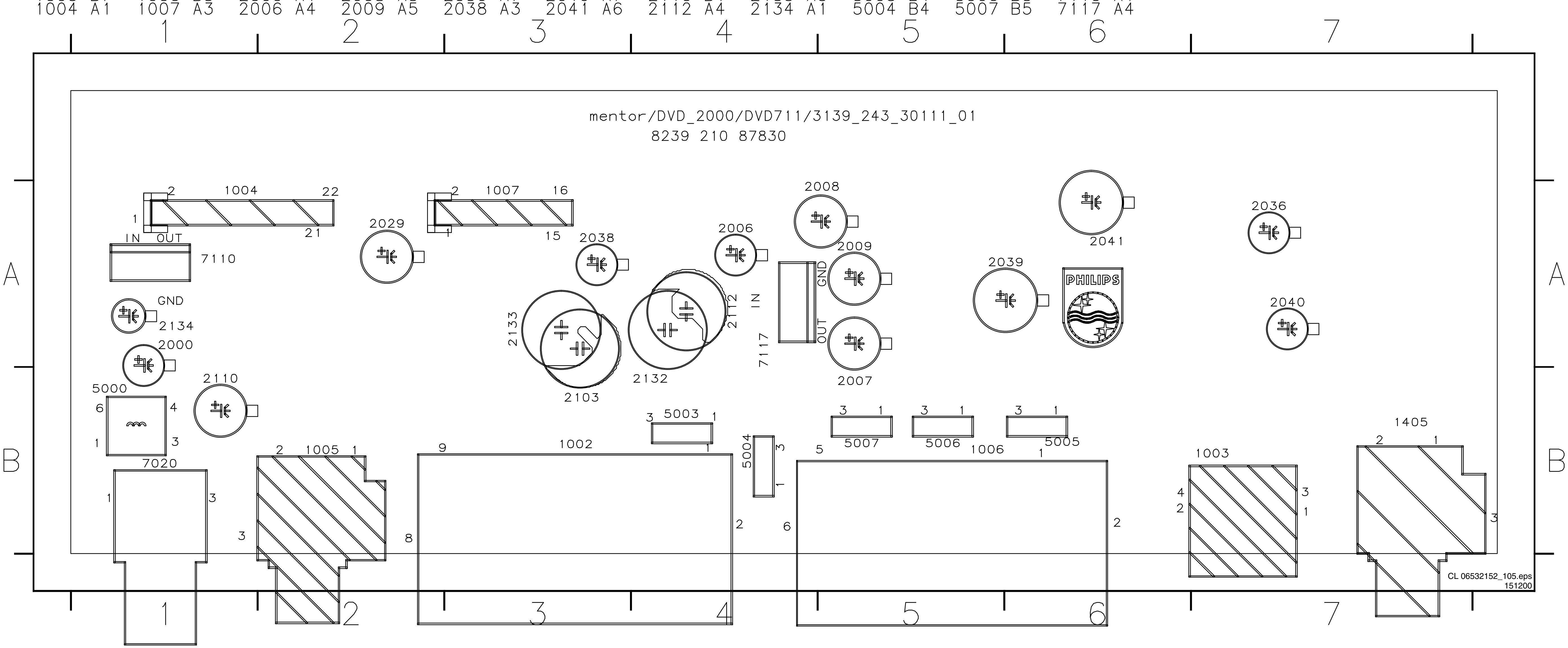
AV Board (F, S, U): Audio



1002-B G13	F210 D1
1002-C E13	F211 E1
1004 C1	F212 E1
1005 B12	F213 E1
1405 A12	F214 E1
2000 B7	F215 F1
2001 B11	F216 F1
2002 B7	F230 E1
2004 B11	F233 E1
2030 F2	I101 B7
2038 D2	I102 B8
2039 E2	I103 B8
2100 B4	I105 B3
2101 D6	I106 B10
2103 D9	I108 C3
2104 E11	I109 B10
2106 E8	I110 B8
2107 F6	I112 C3
2108 E4	I115 A6
2109 E5	I120 C11
2110 E5	I127 E10
2112 G9	I128 B4
2113 G11	I140 C5
2115 G8	I141 H9
2119 H11	I142 H10
2121 E11	I143 E9
2124 C12	I145 D7
2125 D8	I153 D8
2126 E8	I154 D9
2132 F8	I155 E10
2133 F8	I156 D11
2134 F2	I157 D7
2135 A11	I159 E10
2136 A12	I161 E12
3000 B7	I162 G12
3001 B9	I163 D5
3002 B3	I165 D5
3003 C3	I166 E5
3004 C3	I167 E4
3014 E9	I171 E9
3015 F9	I172 E4
3016 G9	I174 F5
3017 H9	I175 F7
3057 D2	I176 G8
3100 C10	I177 G9
3101 B6	I178 G9
3102 B6	I179 G10
3103 B3	I180 F11
3105 D6	I181 G5
3106 D6	I182 G7
3107 D9	I183 G10
3108 F2	I205 G12
3109 D2	I207 H11
3110 E11	I217 E12
3112 E9	I223 E11
3113 E10	I261 G12
3114 E8	I262 B12
3115 F6	I263 E12
3116 F6	I270 A12
3117 D3	I271 A12
3118 G9	
3119 G10	
3120 G6	
3121 G11	
3122 G9	
3123 G10	
3124 G8	
3126 G10	
3127 H11	
3129 H11	
3130 E10	
3131 E10	
3132 F11	
3159 D10	
3160 E6	
3161 A10	
3162 A10	
4100 B4	
4105 E4	
5000 B8	
6009 A5	
7004 F9	
7005 H10	
7020 C12	
7103 B4	
7104 E9	
7105 E10	
7108 G9	
7109 G10	
7110 F2	
7112 H12	
7114 F12	
7115-A D8	
7115-B F8	
F200 C1	
F201 C1	
F202 C1	
F203 C1	
F204 D1	
F205 D1	
F206 D1	
F207 C1	
F208 D1	
F209 D1	

Layout AV Board (F, S, U): (top view)

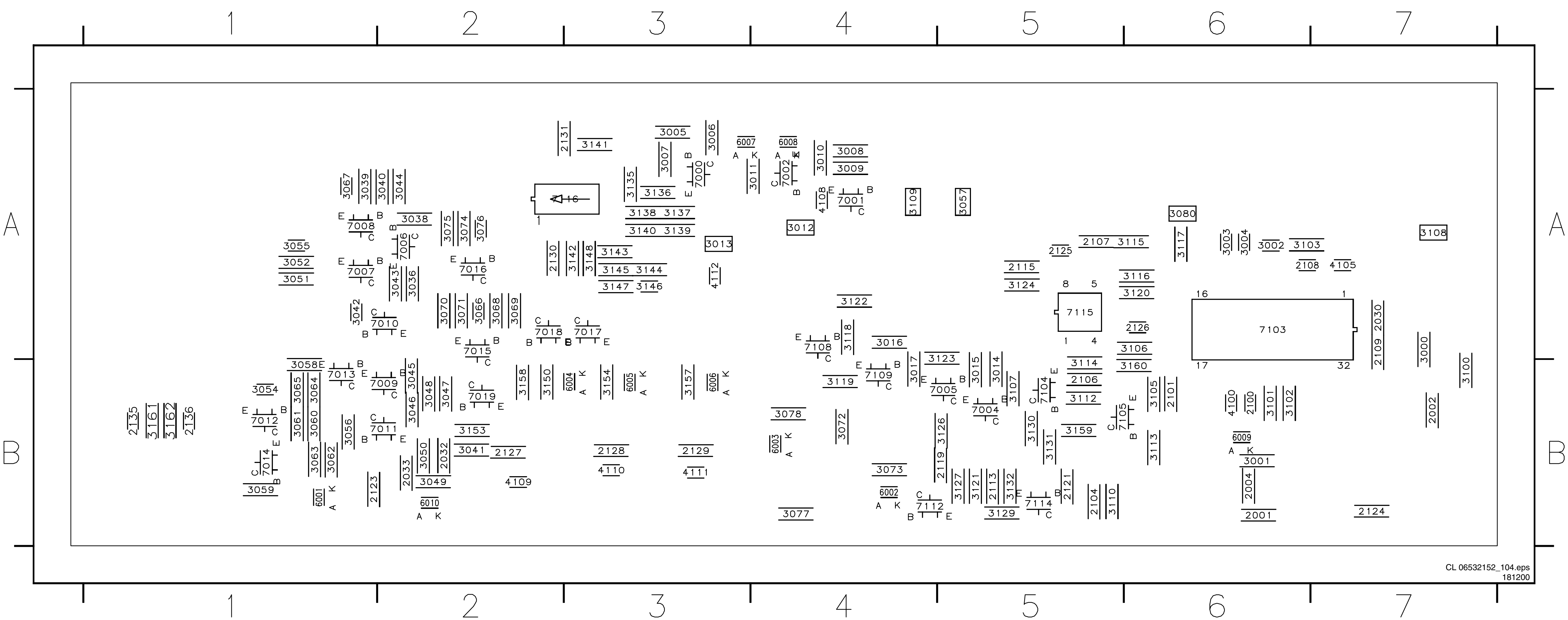
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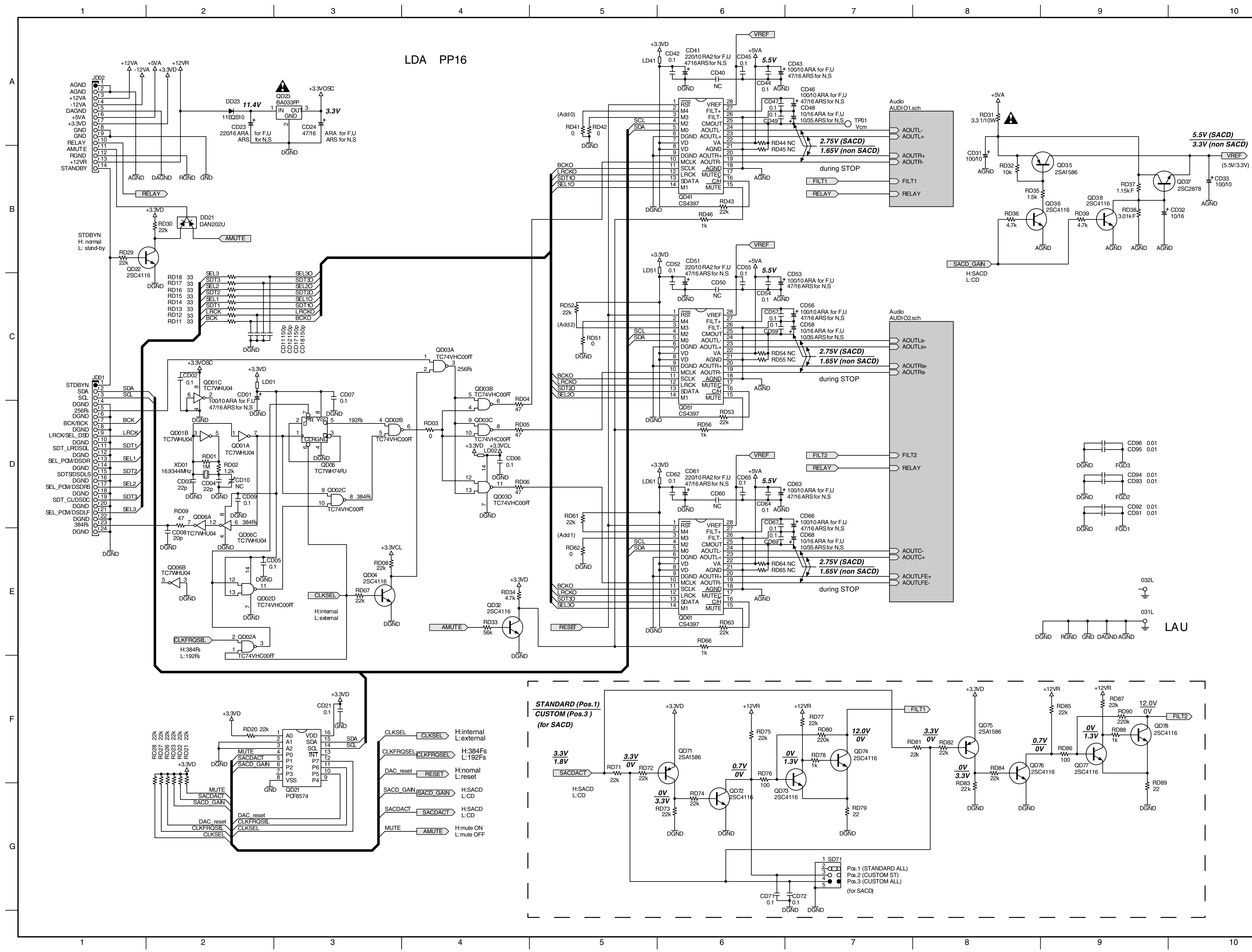
Layout AV Board (F, S, U): (bottom view)

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2001	B6	2113	B5	2135	B1	3011	A4	3043	A2	3057	A5	3070	A2	3103	A6
2002	B7	2115	A5	2136	B1	3012	A4	3044	A2	3058	B1	3071	A2	3105	B6
2004	B6	2119	B5	3000	A7	3013	A3	3045	B2	3059	B1	3072	B4	3106	A6
2030	A7	2121	B5	3001	B6	3014	B5	3046	B2	3060	B1	3073	B4	3107	B5
2032	B2	2123	B1	3002	A6	3015	B5	3047	B2	3061	B1	3074	A2	3108	A7
2033	B2	2124	B7	3003	A6	3016	A4	3048	B2	3062	B1	3075	A2	3109	A4
2100	B6	2125	A5	3004	A6	3017	B4	3049	B2	3063	B1	3076	A2	3110	B5
2101	B6	2126	A6	3005	A3	3036	A2	3050	B2	3064	B1	3077	B4	3112	B5
2104	B5	2127	B2	3006	A3	3038	A2	3051	A1	3065	B1	3078	B4	3113	B6
2106	B5	2128	B3	3007	A3	3039	A1	3052	A1	3066	A2	3080	A6	3114	B5
2107	A5	2129	B3	3008	A4	3040	A2	3054	B1	3067	A1	3100	B7	3115	A6
2108	A6	2130	A2	3009	A4	3041	B2	3055	A1	3068	A2	3101	B6	3116	A6
2109	A7	2131	A3	3010	A4	3042	A1	3056	B1	3069	A2	3102	B6	3117	A6

Ref	Loc	Ref	Loc	Ref	Loc	Ref	Loc	Ref	Loc	Ref	Loc	Ref	Loc
3118	A4	3135	A3	3148	A3	4109	B2	6010	B2	7013	B1	7114	B5
3119	B4	3136	A3	3150	B2	4110	B3	7000	A3	7014	B1	7115	A5
3120	A6	3137	A3	3153	B2	4111	B3	7001	A4	7015	A2	7116	A3
3121	B5	3138	A3	3154	B3	4112	A3	7002	A4	7016	A2		
3122	A4	3139	A3	3157	B3	6001	B1	7004	B5	7017	A3		
3123	A5	3140	A3	3158	B2	6002	B4	7005	B5	7018	A2		
3124	A5	3141	A3	3159	B5	6003	B4	7006	A2	7019	B2		
3126	B5	3142	A3	3160	B6	6004	B3	7007	A1	7103	A6		
3127	B5	3143	A3	3161	B1	6005	B3	7008	A1	7104	B5		
3129	B5	3144	A3	3162	B1	6006	B3	7009	B2	7105	B5		
3130	B5	3145	A3	4100	B6	6007	A3	7010	A2	7108	A4		
3131	B5	3146	A3	4105	A7	6008	A4	7011	B2	7109	B4		
3132	B5	3147	A3	4108	A4	6009	B6	7012	B1	7112	B4		



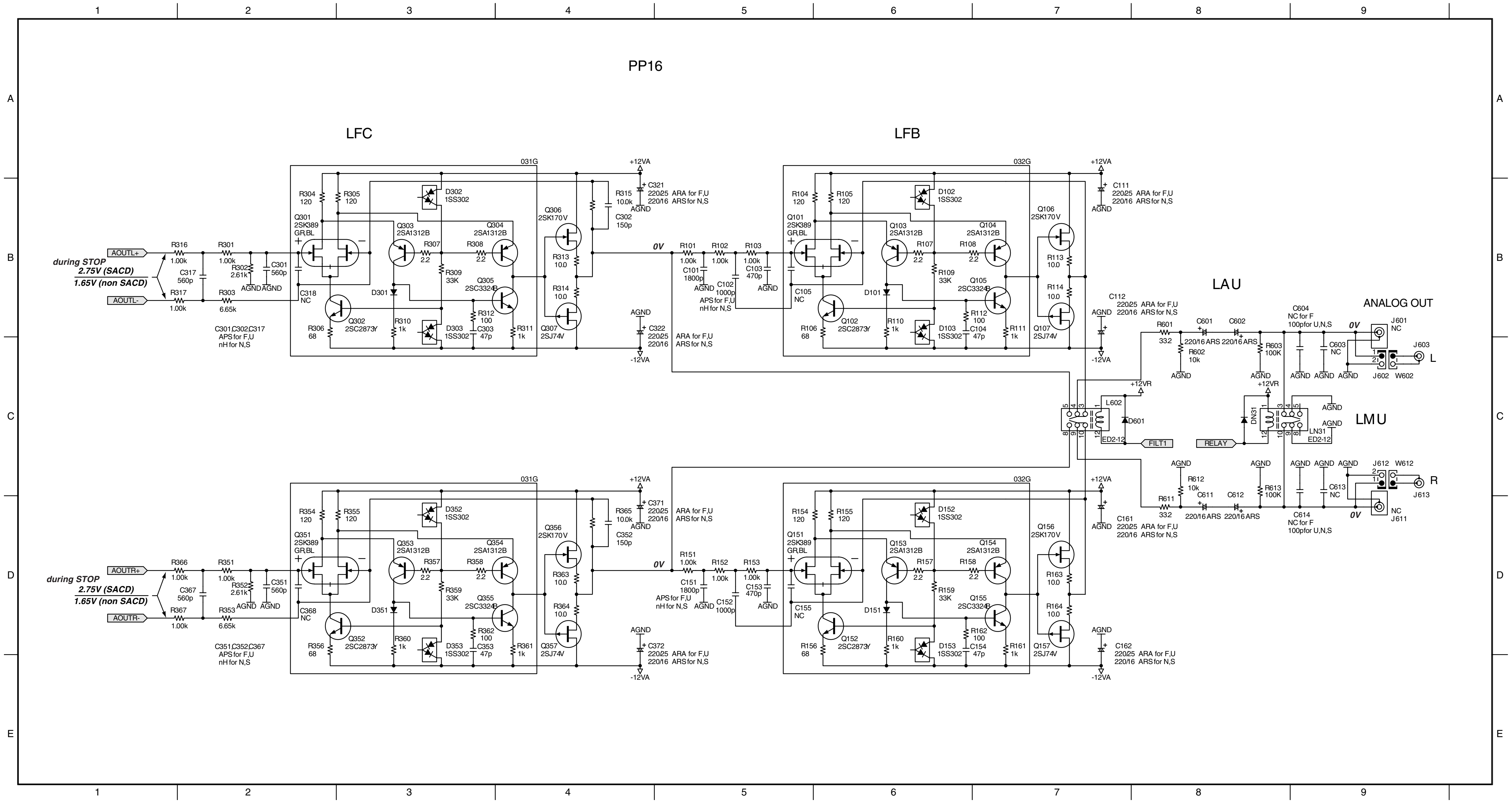
SACD-DAC



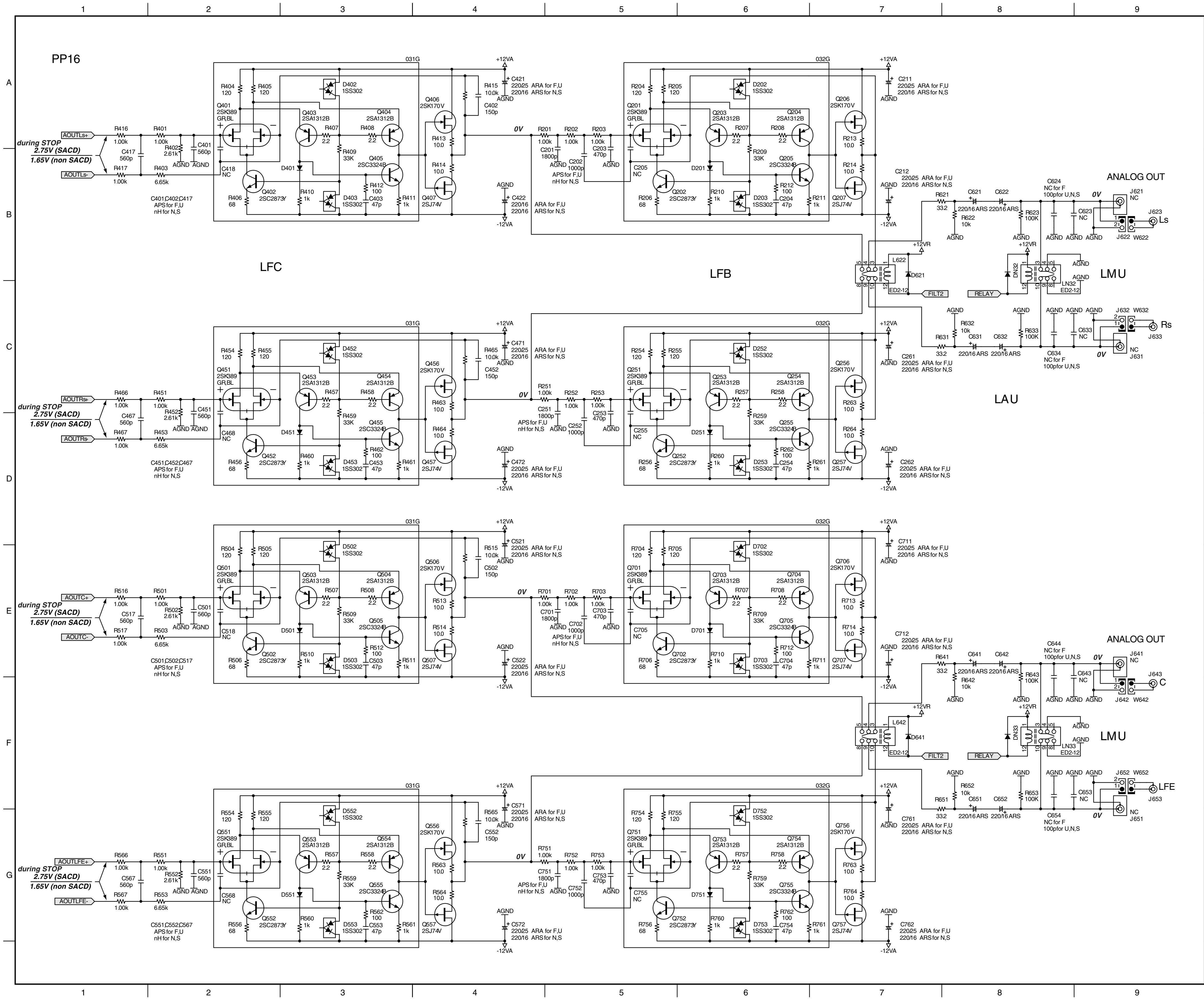
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CD03	D2	RD08	E3
CD04	D2	RD09	E2
CD05	E2	RD11	C2
CD06	D4	RD12	C2
CD07	D3	RD13	C2
CD08	E2	RD14	C2
CD09	D2	RD15	C2
CD11	C2	RD16	C2
CD12	C2	RD17	C2
CD17	C2	RD18	C2
CD18	C2	RD20	F2
CD21	F3	RD23	B1
CD23	A2	RD30	B2
CD24	A3	RD31	A8
CD31	B8	RD32	B8
CD32	B9	RD33	E4
CD33	B10	RD34	E4
CD40	A6	RD35	B8
CD41	A6	RD36	B8
CD42	A6	RD37	B8
CD43	A6	RD38	B9
CD44	A6	RD39	B8
CD45	A6	RD41	A5
CD46	A7	RD42	A5
CD47	A6	RD43	B6
CD48	A7	RD44	B6
CD49	A6	RD45	B6
CD50	C6	RD46	B6
CD51	C6	RD51	C5
CD52	C6	RD52	C5
CD54	C6	RD53	C6
CD55	C6	RD54	C6
CD56	C7	RD55	C6
CD57	C6	RD61	D5
CD58	C7	RD62	E5
CD59	C6	RD63	E6
CD60	D6	RD64	E6
CD61	D6	RD65	E6
CD63	D6	RD66	E6
CD64	D6	RD71	F5
CD65	D6	RD72	F5
CD66	E7	RD73	G6
CD67	D6	RD74	G6
CD68	E7	RD75	F6
CD69	E6	RD76	F6
CD71	G6	RD77	F7
CD72	G7	RD78	F7
CD91	D9	RD79	G7
CD92	D9	RD80	F7
CD93	D9	RD81	F8
CD94	D9	RD82	F8
CD95	D9	RD83	G8
CD96	D9	RD84	F8
DD21	B2	RD85	F9
DD23	A2	RD86	F9
JD01	D1	RD87	F9
JD02	A1	RD88	F9
LD01	C2	RD89	G9
LD02	D4	SD71	G7
LD41	A6	XD01	D2
LD51	C6		
LD61	D6		
QD01A	D2		
QD01B	D2		
QD01C	D2		
QD02A	E2		
QD02B	D3		
QD02C	D3		
QD02D	E2		
QD03A	C4		
QD03B	D4		
QD03C	D4		
QD03D	D4		
QD04	E3		
QD05	D3		
QD06A	E2		
QD06B	E2		
QD06C	E2		
QD21	F3		
QD22	B1		
QD23	A3		
QD32	E4		
QD35	B9		
QD36	B9		
QD37	B9		
QD38	B10		
QD41	B6		
QD51	C6		
QD61	E6		
QD71	F6		
QD72	G6		
QD73	G7		
QD74	F7		
QD75	F8		
QD76	F8		
QD77	F9		
QD78	F9		
RD01	D2		
RD02	D2		
RD03	D4		
RD04	D4		
RD05	D4		

Audio1

C101	B5	C154	D6	C321	B4	C601	B8	D102	B6	D352	D3	J613	C9	Q107	B7	Q302	B3	Q355	D4	R107	B6	R152	D5	R161	D7	R306	B1	R315	B4	R357	D3	R366	D2
C102	B5	C155	D5	C322	B4	C602	B8	D103	B6	D353	D3	L602	C7	Q151	D5	Q303	B3	Q356	D4	R108	B7	R153	D5	R162	D6	R307	B3	R316	B1	R358	D3	R367	D2
C103	B5	C161	D7	C351	D2	C603	C9	D151	D6	D601	C7	LN31	C9	Q152	D6	Q304	B4	Q357	D4	R109	B6	R154	D6	R163	D7	R308	B3	R317	B1	R359	D3	R601	B8
C105	B5	C162	D7	C352	D4	C604	C9	D152	D6	DN31	C8	Q101	B5	Q153	D6	Q305	B4	R101	B5	R110	B6	R155	D6	R164	D7	R309	B3	R351	D2	R360	D3	R602	C8
C111	B7	C301	B1	C353	D3	C611	D8	D153	D6	J601	B9	Q102	B6	Q154	D7	Q306	B4	R102	B5	R111	B7	R156	D6	R301	B1	R310	B3	R352	D2	R361	D4	R603	C8
C112	B7	C302	B4	C367	D2	C612	D8	D301	B3	J602	C9	Q103	B6	Q155	D7	Q307	B4	R103	B5	R112	B6	R157	D6	R302	B1	R311	B4	R353	D2	R362	D3	R611	D8
C151	D5	C303	B3	C368	D2	C613	C9	D302	B3	J603	C9	Q104	B7	Q156	D7	Q351	D2	R104	B5	R113	B7	R158	D7	R303	B1	R312	B3	R354	D2	R363	D4	R612	C8
C152	D5	C317	B1	C371	D4	C614	C9	D303	B3	J611	D9	Q105	B7	Q157	D7	Q353	D3	R105	B6	R114	B7	R159	D6	R304	B1	R313	B4	R355	D3	R364	D4	R613	C8
C153	D5	C318	B1	C372	D4	D101	B6	D351	D3	J612	C9	Q106	B7	Q301	B1	Q354	D4	R106	B6	R151	D5	R160	D6	R305	B3	R314	B4	R356	D2	R365	D4		

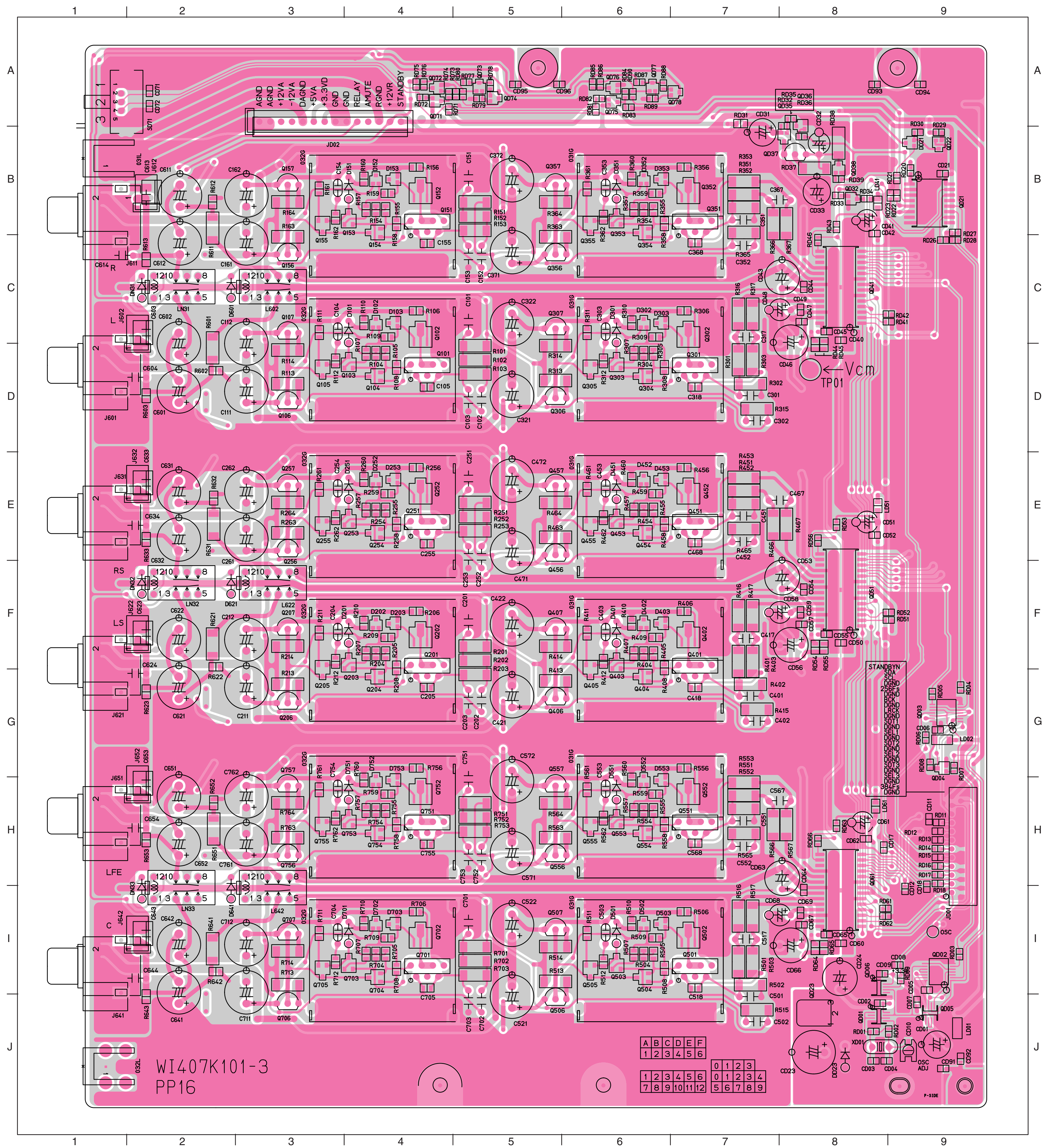


Audio2



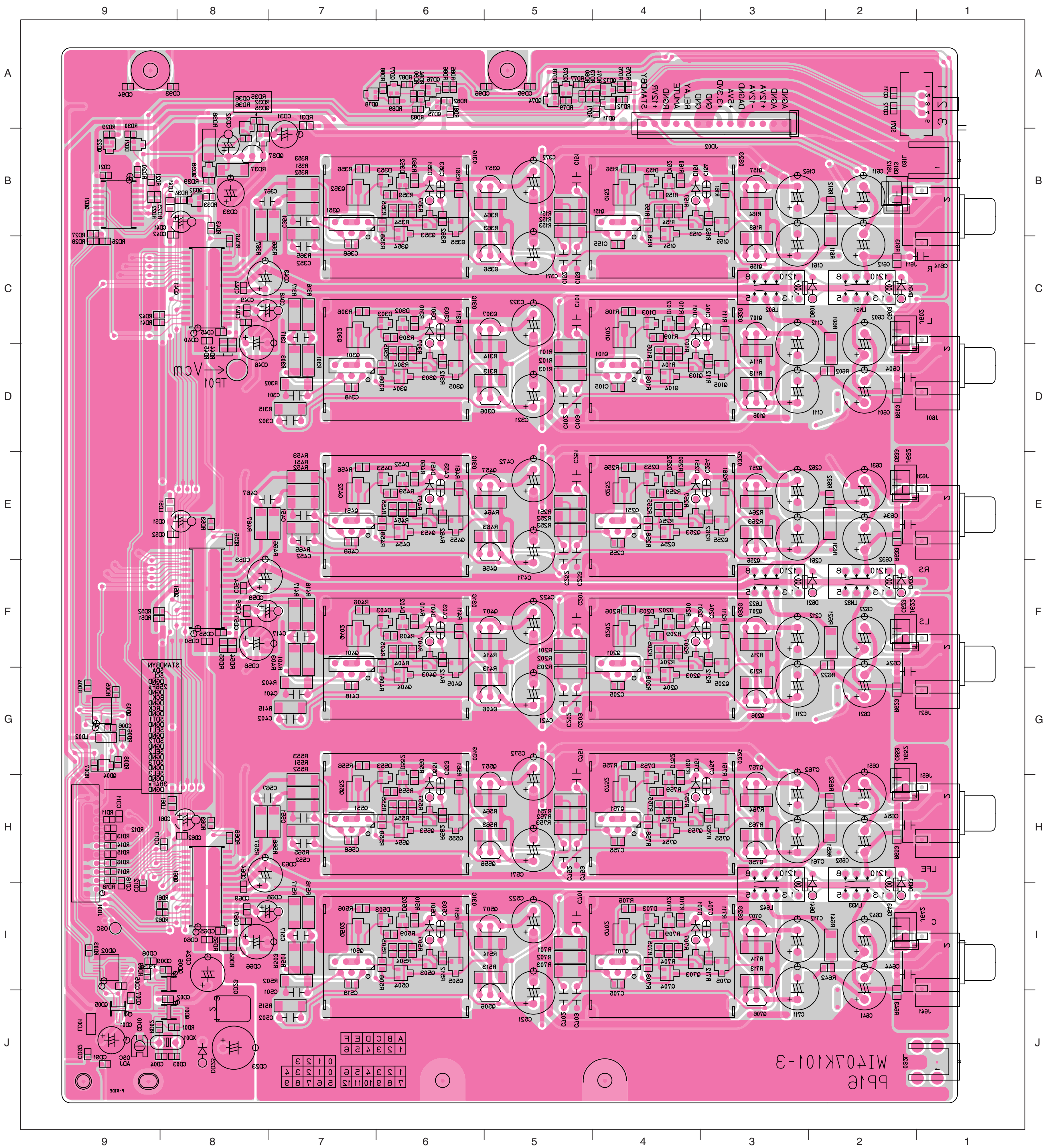
C201	A5	J651	F9	R415	A4
C202	B5	J652	F9	R415	C2
C203	A5	J653	F9	R416	A1
C204	B6	L462	F7	R417	B1
C205	A5	L622	B7	R452	C2
C211	A7	LN32	B8	R453	D2
C212	B7	LN33	F8	R454	C2
C251	C5	Q201	A5	R455	C2
C251	D4	Q202	B5	R456	D2
C252	D5	Q203	A6	R457	C3
C253	C5	Q204	A6	R458	C3
C254	D6	Q205	B6	R459	C3
C255	C5	Q206	A7	R460	D3
C261	C7	Q207	B7	R461	D3
C262	D7	Q251	C5	R462	D3
C401	A2	Q252	D5	R463	C4
C402	A4	Q253	C6	R464	D4
C403	B3	Q254	C6	R465	C4
C417	B1	Q255	D6	R466	C1
C418	B2	Q256	C7	R467	D1
C421	A4	Q257	D7	R501	E2
C422	B4	Q401	A2	R502	E2
C451	C2	Q402	B2	R503	E2
C452	C4	Q403	A3	R504	E2
C453	D3	Q404	A3	R505	E2
C467	D1	Q405	B3	R506	E2
C468	C2	Q406	A4	R507	E3
C471	C4	Q407	B4	R508	E3
C472	D4	Q451	C2	R509	E3
C501	E2	Q452	D2	R510	E3
C502	E4	Q453	C3	R511	E3
C503	E3	Q454	C3	R512	E3
C517	E1	Q455	D3	R513	E4
C522	E4	Q456	C4	R514	E4
C551	G2	Q457	D4	R515	E4
C552	G4	Q501	E2	R516	E1
C553	G3	Q502	E2	R517	E1
C567	G1	Q503	E3	R551	G2
C568	G2	Q504	E3	R552	G2
C571	G4	Q505	E3	R553	G2
C572	G4	Q506	E4	R554	G2
C621	B8	Q507	E4	R555	G2
C622	B8	Q551	G2	R556	G2
C623	B8	Q552	G2	R557	G3
C631	C8	Q553	G3	R558	G3
C632	C8	Q554	G3	R559	G3
C633	C8	Q555	G3	R560	G3
C634	C8	Q556	G4	R561	G3
C641	E8	Q557	G4	R562	G3
C642	E8	Q701	E5	R563	G4
C643	E8	Q702	E5	R564	G4
C644	E8	Q703	E6	R565	G4
C651	F8	Q704	E6	R566	G1
C652	F8	Q705	E6	R567	G1
C653	F8	Q706	E7	R621	B8
C654	F8	Q707	E7	R622	B8
C701	E5	Q751	G5	R623	B8
C702	E5	Q752	G5	R631	C8
C703	E5	Q753	G6	R632	C8
C704	E6	Q754	G6	R633	C8
C711	D7	Q755	G6	R641	E8
C712	E7	Q756	G7	R642	E8
C751	G5	Q757	G7	R643	E8
C752	G5	R201	A5	R651	F8
C753	G5	R202	A5	R652	F8
C754	G6	R203	A5	R653	F8
C755	G5	R204	A5	R701	E5
C761	G7	R205	A5	R702	E5
C762	G7	R206	B5	R703	E5
C924	B8	R207	A6	R704	E5
D201	B6	R208	A6	R705	E5
D202	A6	R209	A6	R706	E5
D203	B6	R210	B6	R707	E6
D251	D6	R211	B6	R708	E6
D252	C6	R212	B6	R709	E6
D253	D6	R213	A7	R710	E6
D401	B3	R214	B7	R711	E6
D402	A3	R251	C5	R712	E6
D403	B3	R252	C5	R713	E7
D451	D3	R253	C5	R714	E7
D452	C3	R254	C5	R751	G5
D453	D3	R255	C5	R752	G5
D461	F7	R256	D5	R753	G5
D502	E3	R257	C6	R754	G5
D503	E3	R258	C6	R755	G5
D551	G3	R259	C6	R756	G5
D552	G3	R260	D6	R757	G6
D553	G3	R261	D6	R758	G6
D621	B7	R262	D6	R759	G6
D701	E6	R263	C7	R760	G6
D702	E6	R264	D7	R761	G6
D703	E6	R401	A2	R762	G6
D751	G6	R402	A2	R763	G7
D752	G6	R403	B2	R764	G7
D753	G6	R404	A2		
DN32	B8	R405	A2		
DN33	F8	R406	B2		
J621	B9	R407	A3		
J622	B9	R408	A3		
J623	B9	R409	B3		
J631	C9	R410	B3		
J632	C9	R411	B3		
J633	C9	R412	B3		
J641	E9	R413	A4		
J642	F9	R414	B4		

Layout DAC board (top view)



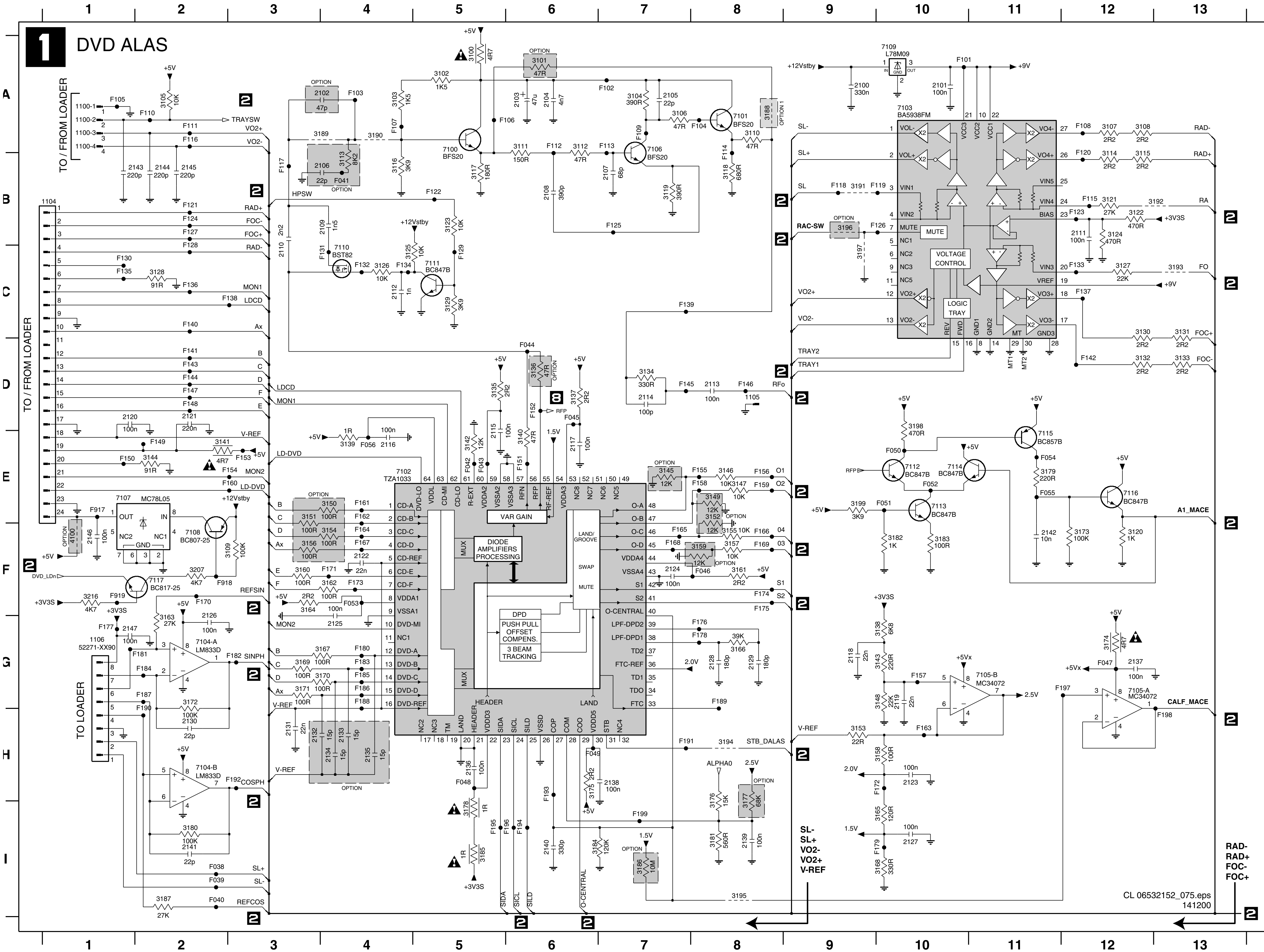
Ref.	Loc.
CD01	J9
CD02	J8
CD03	J8
CD04	J9
CD05	I9
CD06	G9
CD07	J9
CD08	I9
CD09	I8
CD10	J9
CD11	H9
CD12	I9
CD17	H8
CD18	I9
CD21	B9
CD23	J8
CD24	I8
CD31	A7
CD32	A8
CD33	B8
CD40	C8
CD41	B8
CD42	B8
CD43	C7
CD44	C8
CD45	C8
CD46	D8
CD47	C8
CD48	C7
CD49	C8
CD50	F8
CD51	E8
CD52	E8
CD53	F8
CD54	F8
CD55	F8
CD56	F8
CD57	F8
CD58	F8
CD59	F8
CD60	I8
CD61	H8
CD62	H8
CD63	H7
CD64	H8
CD65	I8
CD66	I8
CD67	I8
CD68	I7
CD69	I8
CD71	A2
CD72	A2
CD91	J9
CD92	J9
CD93	A8
CD94	A9
CD95	A5
CD96	A5
C101	C5
C102	D5
C103	D5
C104	C3
C105	D4
C111	D2
C112	C2
C151	B5
C152	C5
C153	C5
C154	B3
C155	C4
C161	C2
C162	B2
C201	F5
C202	G5
C203	G5
C204	F3
C205	G4
C211	G3
C212	F2
C251	E5
C252	F5
C253	F5
C254	E3
C255	E4
C261	E2
C262	E2
C301	D7
C302	D7
C303	C6
C317	C7
C318	D7
C321	D5
C322	C5
C351	B7
C352	C7
C353	B6
C367	B7
C368	C7
C371	C5
C372	B5
C401	G7
C402	G7
C403	F6
C417	F7
C418	G7
C421	G5
C422	F5
C451	E7
C452	E7
C453	E6
C467	E8
C468	E7
C471	F5
C472	E5
C501	J7
C502	J7
C503	I6
C517	I7
C518	I7
C521	J5
C522	I5
C551	H7
C552	H7
C553	G6
C567	H7
C568	H7
C571	H5
C572	G5
C601	D2
C602	C2
C603	C2
C604	D2
C611	B2
C612	C2
C613	B2
C614	C1
C621	G2
C622	F2
C623	F2
C624	F2
C631	E2
C632	E2
C633	E2
C634	E2
C641	J2
C642	I2
C643	I2
C644	I2
C651	H2
C652	H2
C653	H2
C654	H2
C701	I5
C702	J5
C703	J5
C704	I3
C705	I4
C711	J3
C712	I3
C751	G5
C752	H5
C753	H5
C754	G3
C755	H4
C761	H2
C762	G2
DD21	B9
DD23	J8
DN31	C2
DN32	F2
DN33	H2
D101	C4
D102	C4
D103	C4
D151	B4
D152	B4
D153	B4
D201	F3
D202	F4
D203	F4
D251	E4
D252	E4
D253	E4
D301	C6
D302	C6
D303	C6
D351	B6
D352	B6
D353	B6
D401	F6
D402	F6
D403	F6
D451	E6
D452	E6
D453	E6
D501	I6
D502	I6
D503	I6
D551	G6
D552	G6
D553	G6
D601	C2
D621	F2
D641	I2
D701	I4
D702	I4
D703	I4
D751	G4
D752	G4
D753	G4
JD01	I9
JD02	A3
J601	D1
J602	C2
J611	C2
J612	B2
J621	G2
J622	F2
J631	E1
J632	E2
J641	J1
J642	I2
J651	H1
J652	G2
LD01	J9
LD02	G9
LD41	B8
LD51	E8
LD61	H8
LN31	C2
LN32	F2
LN33	H2
L601	D2
L602	C3
L611	B2
L621	G2
L622	F2
L631	E2
L641	I2
L642	I3
L651	H2
QD01	J8
QD02	I9
QD03	G9
QD04	G9
QD05	J9
QD06	I8
QD21	B9
QD22	B9
QD23	J8
QD32	B8
QD35	A8
QD36	A8
QD37	B7
QD38	B8
QD41	C8
QD51	F8
QD61	H8
QD71	A4
QD72	A4
QD73	A5
QD74	A5
QD75	A6
QD76	A6
QD77	A6
QD78	A6
Q101	D4
Q102	C4
Q103	D4
Q104	D4
Q105	D3
Q106	D3
Q107	C3
Q151	B4
Q152	B4
Q153	B3
Q154	B4
Q155	B3
Q156	C3
Q157	B3
Q201	F4
Q202	F4
Q203	F4
Q204	F4
Q205	G3
Q206	G3
Q207	F3
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Q255	E3
Q256	E3
Q257	E3
Q301	D7
Q302	C7
Q303	D6
Q304	D6
Q305	D6
Q306	D5
Q307	C5
Q351	B7
Q352	B7
Q353	B6
Q354	B6
Q355	B6
Q356	C5
Q357	B5
Q401	F7
Q402	F7
Q403	G6
Q404	G6
Q405	G6
Q406	G5
Q407	F5
Q451	E7
Q452	E7
Q453	E6
Q454	E6
Q455	E6
Q456	F5
Q457	E5
Q501	I7
Q502	I7
Q503	I6
Q504	I6
Q505	I6
Q506	J5
Q507	I5
Q551	H7
Q552	H7
Q553	H6
Q554	H6
Q555	H6
Q556	H5
Q557	G5
Q701	I4
Q702	I4
Q703	I4
Q704	I4
Q705	I3
Q706	J3
Q707	I3
Q751	H4
Q752	H4
Q753	H4
Q754	H4
Q755	H3
Q756	H3
Q757	H3
RD01	J8
RD02	J9
RD03	I9
RD04	G9
RD05	G9
RD06	G9
RD07	G9
RD08	G9
RD09	I9
RD11	H9
RD12	H9
RD13	H9
RD14	H9
RD15	H9
RD16	H9
RD17	H9
RD18	H9
RD20	B9
RD21	B9
RD22	B9
RD23	B9
RD26	C9
RD27	C9
RD28	C9
RD29	B9
RD30	B9
RD31	A7
RD32	A8
RD33	B8
RD34	B8
RD35	A8
RD36	A8
RD37	B8
RD38	A8
RD39	B8
RD41	C9
RD42	C9
RD43	B8
RD44	D8
RD45	D8
RD46	C8
RD51	F9
RD52	F9
RD53	E8
RD54	F8
RD55	F8
RD56	E8
RD61	I9
RD62	I9
RD63	H8
RD64	I8
RD65	I8
RD66	H8
RD71	A4
RD72	A4
RD73	A4
RD74	A4
RD75	A4
RD76	A4
RD77	A5
RD78	A5
RD79	A5
RD80	A5
RD81	A6
RD82	A6
RD83	A6
RD84	A6
RD85	A6
RD86	A6
RD87	A6
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R104	D4
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R107	D4
R108	D4
R109	C4
R110	C4
R111	C3
R112	D3
R113	D3
R114	D3
R151	B5
R152	B5
R153	B5
R154	B4
R155	B4
R156	B4
R157	B4
R158	B4
R159	B4
R160	B4
R161	B3
R162	B3
R163	B3
R164	B3
R201	F5
R202	F5
R203	F5
R204	F4
R205	F4
R206	F4
R207	F4
R208	F4
R209	F4
R210	F4
R211	F3
R212	F3
R213	F3
R214	F3
R251	E5
R252	E5
R253	E5
R254	E4
R255	E4
R256	E4
R257	E4
R258	E4
R259	E4
R260	E4
R261	E3
R262	E3
R263	E3
R264	E3
R301	D7
R302	D7
R303	D7
R304	D6
R305	D6
R306	C7
R307	D6
R308	D6
R309	C6
R310	C6
R311	C6
R312	D6
R313	D5
R314	D5
R315	D7
R316	C7
R317	C7
R351	B7
R352	B7
R353	B7
R354	B6
R355	B6
R356	B7
R357	B6
R358	B6
R359	B6
R360	B6
R361	B6
R362	B6
R363	B5
R364	B5
R365	C7
R366	C7
R367	C8
R401	F7
R402	G7
R403	F7
R404	F6
R405	F6
R406	F7
R407	F6
R408	F6
R409	F6
R410	F6
R411	F6
R412	F6
R413	F5
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R456	E7
R457	E6
R458	E6
R459	E6
R460	E6
R461	E6
R462	E6
R463	E5
R464	E5
R465	E7
R466	E7
R467	E8
R501	I7
R502	I7
R503	I7
R504	I6
R505	I6
R506	I7
R507	I6
R508	I6
R509	I6
R510	I6
R511	I6
R512	I6
R513	I5
R514	I5
R515	J7
R516	I7
R517	I7
R551	H7
R552	H7
R553	H7
R554	H6
R555	H6
R556	G7
R557	H6
R558	H6
R559	H6
R560	G6
R561	H6
R562	H6
R563	H5
R564	H5
R565	H7
R566	H7
R567	H8
R601	C2
R602	D2
R603	D2
R611	C2
R612	B2
R613	C2
R621	F2
R622	F2
R623	G2
R631	E2
R632	E2
R633	E2
R641	I2
R642	I2
R643	J2
R651	H2
R652	H2
R653	H2
R701	I5
R702	I5
R703	I5
R704	I4
R705	I4
R706	I4
R707	I4
R708	I4
R709	I4
R710	I4
R711	I3
R712	I3
R713	I3
R714	I3
R751	H5
R752	H5
R753	H5
R754	H4
R755	H4
R756	G4
R757	H4
R758	H4
R759	H4
R760	G4
R761	H3
R762	H3
R763	H3
R764	H3
SD71	A2
XD01	J8
031L	B2
032L	J2

Layout DAC board (Bottom view)



Part	Location
CD01	J9
CD02	J8
CD03	J8
CD04	J9
CD05	I9
CD06	G9
CD07	J9
CD08	I9
CD09	I8
CD10	J9
CD11	H9
CD12	I9
CD17	H8
CD18	I9
CD21	B9
CD23	J8
CD24	I8
CD31	A7
CD32	A8
CD33	B8
CD40	C8
CD41	B8
CD42	B8
CD43	C7
CD44	C8
CD45	C8
CD46	D8
CD47	C8
CD48	C7
CD49	C8
CD50	F8
CD51	E8
CD52	E8
CD53	F8
CD54	F8
CD55	F8
CD56	F8
CD57	F8
CD58	F8
CD59	F8
CD60	I8
CD61	H8
CD62	H8
CD63	H7
CD64	H8
CD65	I8
CD66	I8
CD67	I8
CD68	I7
CD69	I8
CD71	A2
CD72	A2
CD91	J9
CD92	J9
CD93	A8
CD94	A9
CD95	A5
CD96	A5
C101	C5
C102	D5
C103	D5
C104	C3
C105	D4
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C151	B5
C152	C5
C153	C5
C154	B3
C155	C4
C161	C2
C162	B2
C201	F5
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C203	G5
C204	F3
C205	G4
C211	G3
C212	F2
C251	E5
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C253	F5
C254	E3
C255	E4
C261	E2
C262	E2
C301	D7
C302	D7
C303	C6
C317	C7
C318	D7
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C351	B7
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C353	B6
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C418	G7
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C518	I7
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C571	H5
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C603	C2
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C612	C2
C613	B2
C614	C1
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C642	I2
C643	I2
C644	I2
C651	H2
C652	H2
C653	H2
C654	H2
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C703	J5
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C705	I4
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C753	H5
C754	G3
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D153	B4
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D203	F4
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R362	B6
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R560	G6
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R602	D2
R603	D2
R611	C2
R612	B2
R613	C2
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R642	I2
R643	J2
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R652	H2
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R704	I4
R705	I4
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R707	I4
R708	I4
R709	I4
R710	I4
R711	I3
R712	I3
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R757	H4
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R760	G4
R761	H3
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Mono board: DVD ALAS

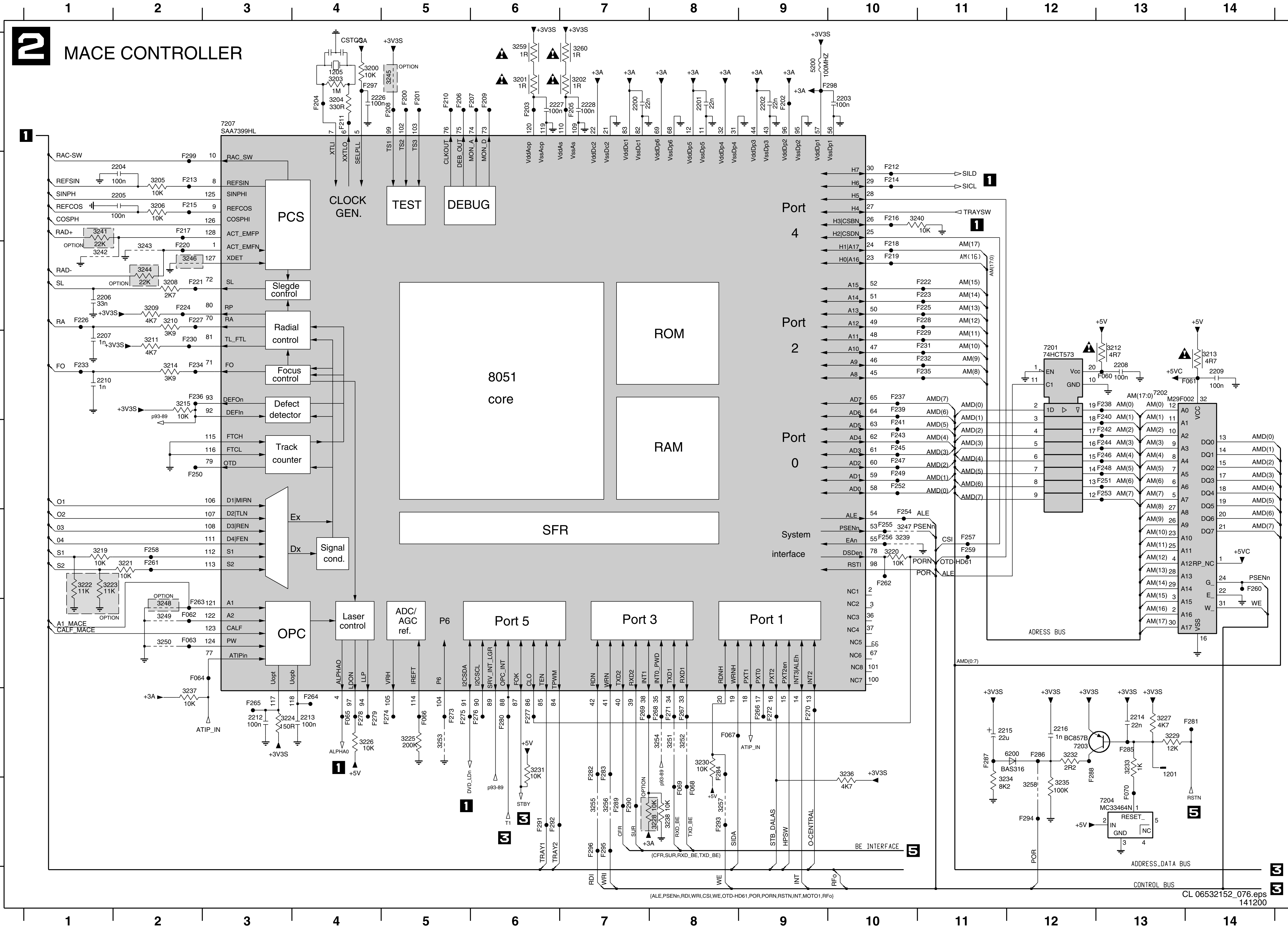


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3155 F8
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3157 F8
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3160 F3
3161 F8

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3167 G4
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3175 H6
3176 H8
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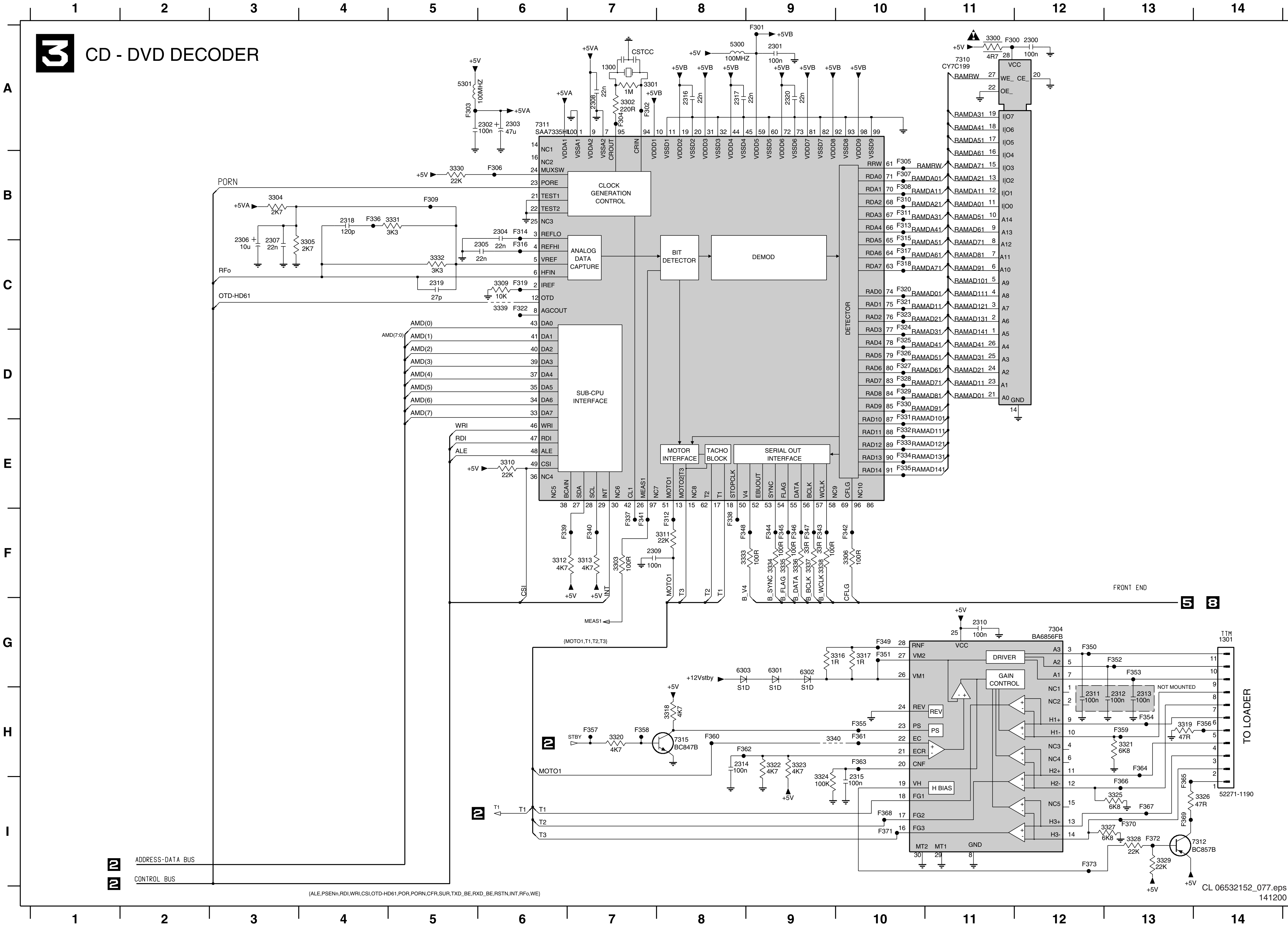
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Mono board: MACE controller



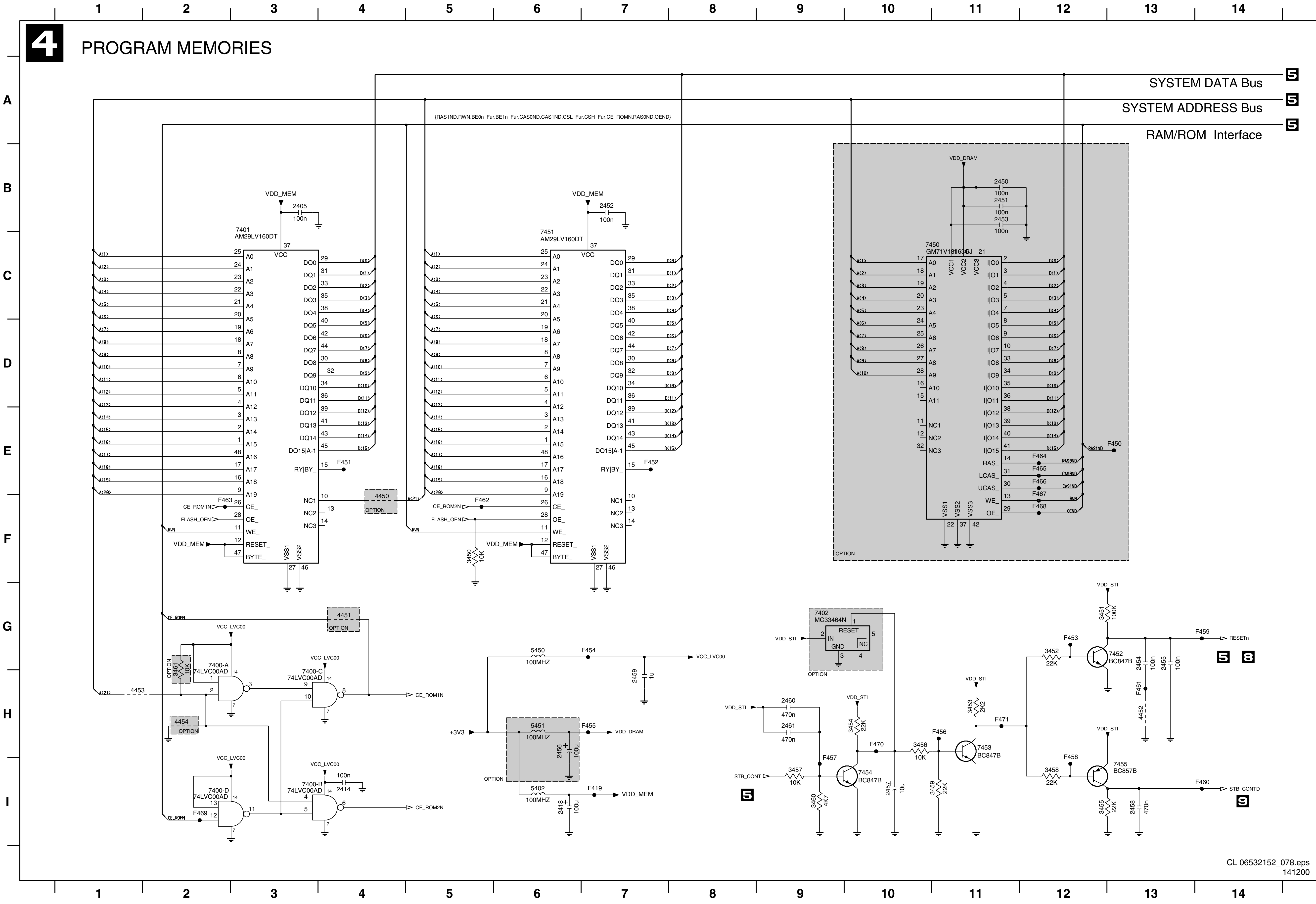
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2203	A10	F227	C2
2204	B2	F228	C11
2205	B2	F229	D11
2206	C1	F230	D2
2207	D1	F231	D11
2208	D13	F232	D11
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2215	H11	F238	D13
2216	H12	F239	D10
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3203	A4	F246	E13
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3206	B2	F249	E10
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3209	C2	F251	E13
3210	C2	F252	E10
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3213	D14	F255	F10
3214	D2	F256	F10
3215	D2	F257	F11
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3221	F2	F260	F14
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3226	H4	F265	H3
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3228	I8	F267	H8
3229	H13	F268	H8
3230	H8	F269	H7
3231	H6	F270	H9
3232	H12	F271	H8
3233	H13	F272	H9
3234	I11	F273	H5
3235	I12	F274	H5
3236	H10	F275	H5
3237	H2	F276	H6
3238	I8	F277	H6
3239	F10	F278	H4
3240	B10	F279	H4
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3244	C2	F283	H7
3245	A5	F284	H8
3246	C2	F285	H13
3247	F10	F286	H12
3248	G2	F287	H11
3249	G2	F288	H12
3250	G2	F289	I7
3251	H8	F290	I7
3252	H8	F291	I6
3253	H5	F292	I6
3254	H8	F293	I8
3255	I7	F294	I12
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3258	I12	F297	A4
3259	A6	F298	A10
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6200	H12		
7201	D12		
7202	D13		
7203	H12		
7204	I13		
7207	A3		
F060	D13		
F061	D14		
F062	G2		
F063	G2		
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F067	H8		
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F069	I8		
F070	I13		
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F212	B10		
F213	B2		
F214	B10		
F215	B2		
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Mono board: CD - DVD decoder



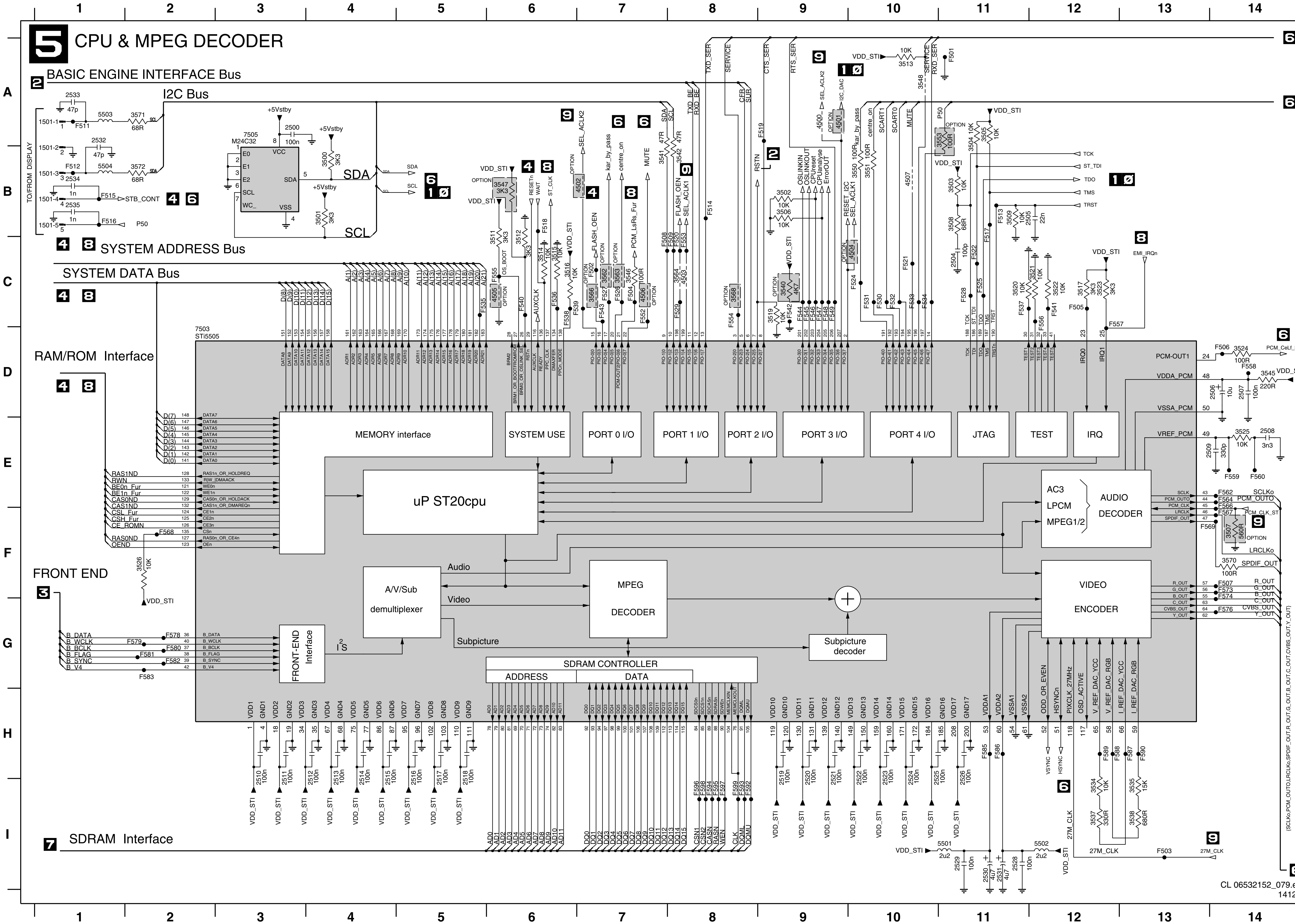
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2312	H13
2313	H13
2314	H8
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2317	A8
2318	B4
2319	C5
2320	A9
3300	A11
3301	A7
3302	A7
3303	F7
3304	B3
3305	C4
3306	F10
3309	C6
3310	E6
3311	F8
3312	F6
3313	F7
3316	G10
3317	G10
3318	H8
3319	H13
3320	H7
3321	H13
3322	H9
3323	H9
3324	I9
3325	I13
3326	I14
3327	I13
3328	I13
3329	I13
3330	B5
3331	B5
3332	C5
3333	F8
3334	F9
3335	F9
3336	F9
3337	F9
3338	F9
3339	C6
3340	H9
5300	A8
5301	A5
6301	G9
6302	G9
6303	G8
7304	G12
7310	A11
7311	A6
7312	I13
7315	H8
F300	A11
F301	A9
F302	A7
F303	A5
F304	A7
F305	B10
F306	B6
F307	B10
F308	B10
F309	B5
F310	B10
F311	B10
F312	F8
F313	B10
F314	B6
F315	C10
F316	C6
F317	C10
F318	C10
F319	C6
F320	C10
F321	C10
F322	C6
F323	C10
F324	D10
F325	D10
F326	D10
F327	D10
F328	D10
F329	D10
F330	D10
F331	E10
F332	E10
F333	E10
F334	E10
F335	E10
F336	B4
F337	F7
F338	F8
F339	F6
F340	F7
F341	F7
F342	F10
F343	F9
F344	F9
F345	F9
F346	F9
F347	F9
F348	F8
F349	G10
F350	G12
F351	G10
F352	G13
F353	G13
F354	H13
F355	H10
F356	H14
F357	H7
F358	H7
F359	H13
F360	H8
F361	H10
F362	H8
F363	H10
F364	H13
F365	I13
F366	I13
F367	I13
F368	I10
F369	I13
F370	I13
F371	I10
F372	I13
F373	I12

Mono board: Program memories



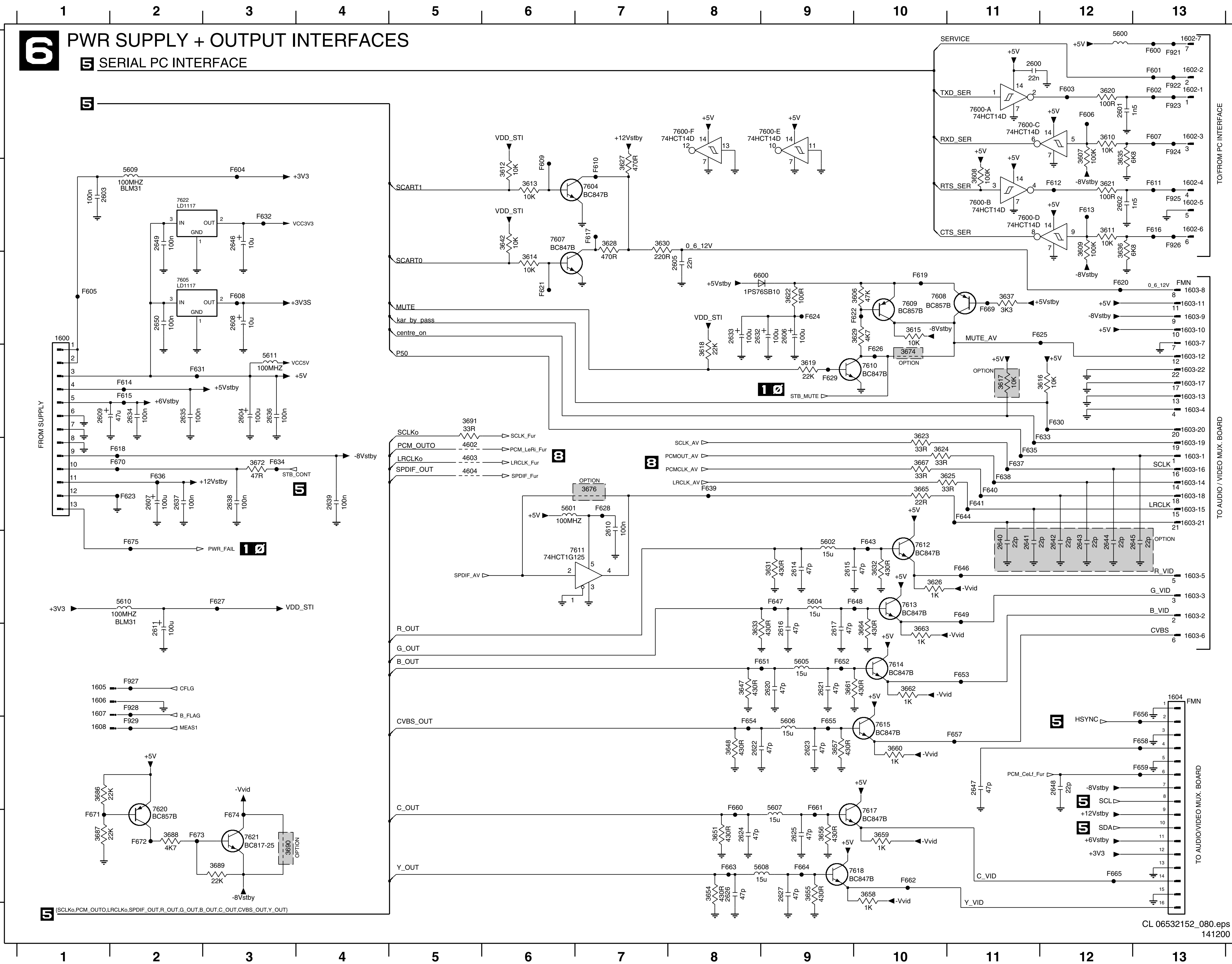
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2414 I4
2418 I6
2450 B11
2451 B11
2452 B7
2453 B11
2454 G13
2455 G13
2456 H6
2457 I10
2458 I13
2459 H7
2460 H9
2461 H9
3450 F5
3451 G12
3452 G12
3453 H11
3454 H10
3455 I12
3456 H10
3457 I9
3458 I12
3459 I11
3460 I9
3461 G2
4450 F4
4451 G4
4452 H13
4453 H1
4454 H2
5402 I6
5450 G6
5451 H6
7400-A G2
7400-B I3
7400-C H3
7400-D I2
7401 C3
7402 G9
7450 C10
7451 C6
7452 G13
7453 H11
7454 I10
7455 I13
F419 I7
F450 E13
F451 E4
F452 E7
F453 G12
F454 G7
F455 H7
F456 H11
F457 I9
F458 I12
F459 G14
F460 I14
F461 H13
F462 F5
F463 F2
F464 E12
F465 E12
F466 E12
F467 F12
F468 F12
F469 I2
F470 H10
F471 H11

Mono board: CPU & MPEG decoder



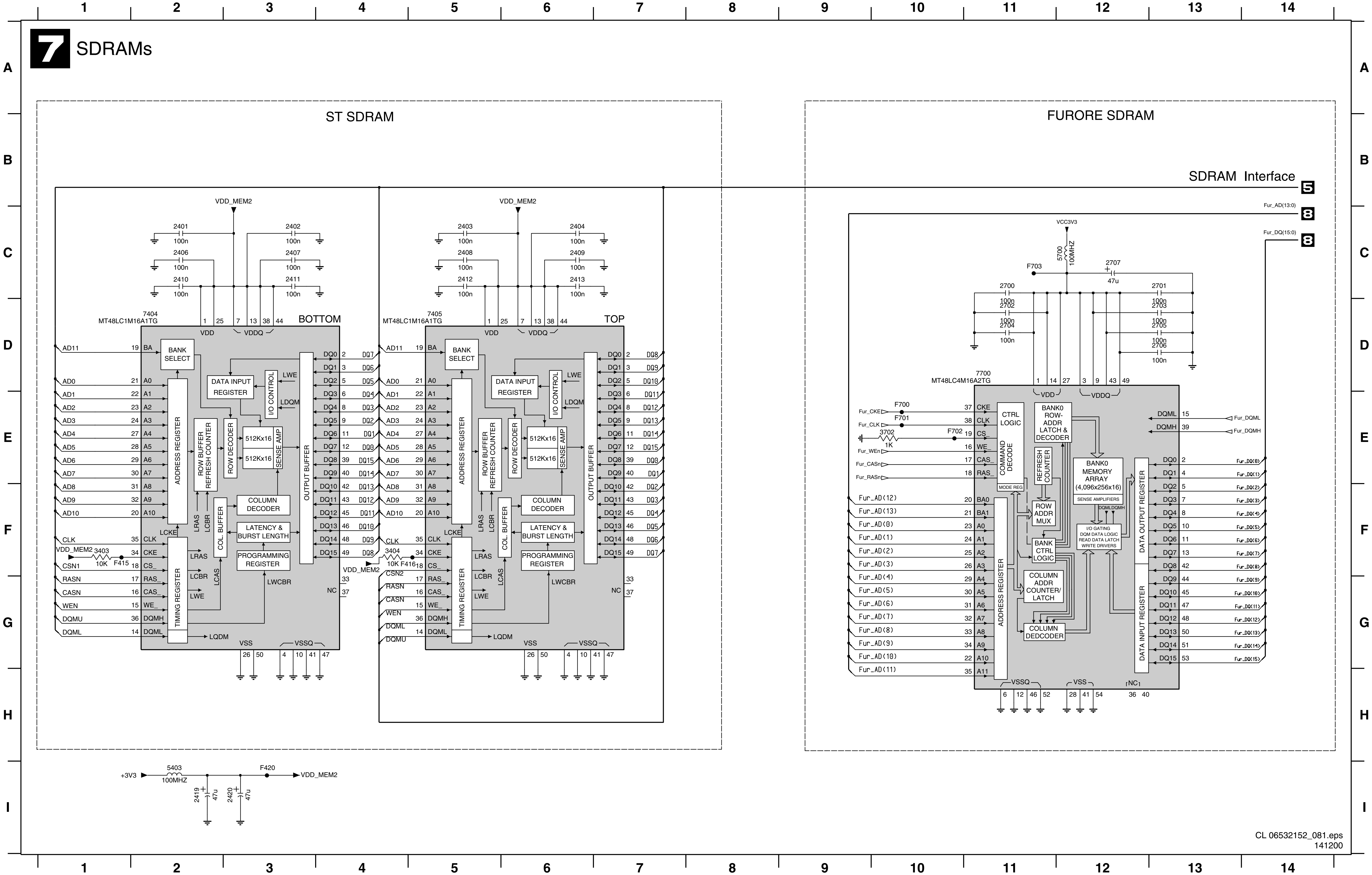
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1501-2 B1	F521 C10
1501-3 B1	F522 C11
1501-4 B1	F524 C10
1501-5 B1	F525 C11
2500 A3	F526 C7
2504 C11	F527 C7
2505 B12	F528 C11
2506 D14	F529 C8
2507 D14	F530 C10
2508 E14	F531 C10
2509 E14	F532 C10
2510 H3	F533 C10
2511 H3	F534 C10
2512 H4	F535 C5
2513 H4	F536 C6
2514 H4	F537 C11
2515 H4	F538 C6
2516 H5	F539 C7
2517 H5	F540 C6
2518 H5	F541 C12
2519 H9	F542 C9
2520 H9	F543 C7
2521 H9	F544 C9
2522 H10	F545 C9
2523 H10	F546 C9
2524 H10	F547 C9
2525 H11	F548 C9
2526 H11	F549 C9
2528 I11	F552 C7
2529 I11	F553 C8
2530 I11	F554 C8
2531 I11	F555 C6
2532 A1	F556 C12
2533 A1	F557 C12
2534 B1	F558 D14
2535 B1	F559 E14
3500 B4	F560 E14
3501 B4	F562 E14
3502 B9	F564 E14
3503 B11	F566 F14
3504 A11	F567 F14
3505 A11	F568 F2
3506 B9	F569 F13
3507 F14	F573 F14
3508 B11	F574 G14
3509 B11	F576 G14
3511 C6	F578 G2
3512 C6	F579 G2
3513 A10	F580 G2
3514 C6	F581 G2
3515 C6	F582 G2
3516 C6	F583 G2
3517 C12	F585 H11
3519 C9	F586 H11
3520 C11	F587 H13
3521 C12	F588 H12
3522 C12	F589 H12
3523 C12	F590 H13
3524 D14	F592 I8
3525 E14	F594 I8
3526 F2	F595 I8
3534 I12	F596 I8
3535 I13	F597 I8
3537 I12	F598 I8
3538 I13	F599 I8
3540 C9	
3541 B7	
3542 B8	
3545 D14	
3546 C7	
3547 B6	
3548 A10	
3550 B10	
3551 B10	
3553 A11	
3562 C7	
3563 C7	
3564 C8	
3566 C7	
3568 C8	
3570 F14	
3571 A2	
3572 B2	
4500 A9	
4501 A9	
4502 B7	
4503 C8	
4504 C10	
4505 C6	
4506 C7	
4507 B10	
5501 I11	
5502 I12	
5503 A1	
5504 B1	
7503 D2	
7505 A3	
F501 A11	
F502 C7	
F503 I13	
F504 C7	
F505 C12	
F506 D14	
F507 F14	
F508 C7	
F509 C8	
F511 A1	
F512 B1	
F513 B11	
F514 B8	
F515 B1	
F516 B1	
F517 B11	
F518 B6	
F519 A9	

Mono board: Power supply & output interfaces



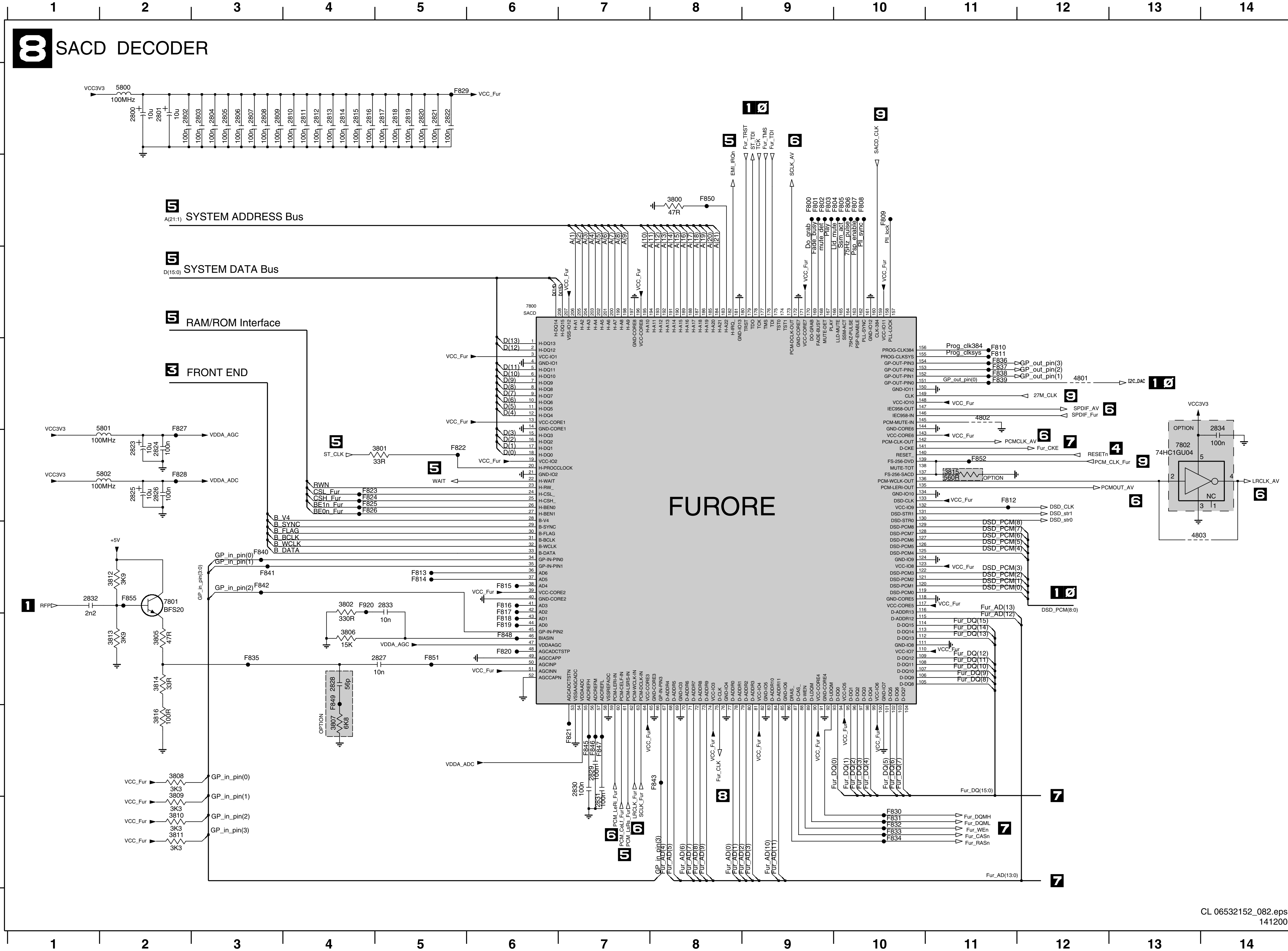
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1602-4 B13
1602-5 B13
1602-6 B13
1602-7 A13
1603-1 E13
1603-10 C13
1603-11 C13
1603-12 D13
1603-13 D13
1603-14 E13
1603-15 E13
1603-16 E13
1603-17 D13
1603-18 E13
1603-19 E13
1603-2 F13
1603-20 D13
1603-21 E13
1603-22 D13
1603-3 F13
1603-4 D13
1603-5 F13
1603-6 G13
1603-7 D13
1603-8 C13
1603-9 C13
1604 G13
1605 G1
1606 G1
1607 G1
1608 H1
2600 A11
2601 A12
2602 B12
2603 B1
2604 D3
2605 C8
2606 C9
2607 E2
2608 C3
2609 D1
2610 E7
2611 G2
2614 F9
2615 F9
2616 G9
2617 G9
2620 G9
2621 G9
2622 H8
2623 H9
2624 I8
2625 I9
2626 I8
2627 I9
2632 C8
2633 C8
2634 D2
2635 D2
2636 D3
2637 E2
2638 E3
2639 E4
2640 F11
2641 F11
2642 F12
2643 F12
2644 F12
2645 F13
2646 B3
2647 H11
2648 H12
2649 B2
2650 C2
3606 C10
3607 A12
3608 B11
3609 B12
3610 A12
3611 B12
3612 B6
3613 B6
3614 C6
3615 C10
3616 D12
3617 D11
3618 D8
3619 D9
3620 A12
3621 B12
3622 C9
3623 E10
3624 E10
3625 E11
3626 F10
3627 B7
3628 B7
3629 C10
3630 B7
3631 F9
3632 F10
3633 G8
3635 A12
3636 B12
3637 C11
3642 B6
3647 G8
3648 H8
3651 I8
3654 I8
3655 I9
3656 I9
3657 H9
3658 I10
3659 I10
3660 H10
3661 G9
3662 G10
3663 G10
3664 G10
3665 E10
3667 E10
3672 E3
3674 D10
3676 E7
3686 H1
3687 I1
3688 I2
3689 I3
3690 I3
3691 D5
4602 E5
4603 E5
4604 E5
5600 A12
5601 E6
5602 F9
5604 F9
5605 G9
5606 H9
5607 I9
5608 I9
5609 B2
5610 F2
5611 D3
6600 C9
7600-A A11
7600-B B11
7600-C A11
7600-D B11
7600-E A9
7600-F A8
7604 B7
7605 C2
7607 B6
7608 C10
7609 C10
7610 D10
7611 F6
7612 F10
7613 F10
7614 G10
7615 H10
7617 I10
7618 I9
7620 H2
7621 I3
7622 B2
F600 A13
F601 A13
F602 A13
F603 A12
F604 B3
F605 C1
F606 A12
F607 A13
F608 C3
F609 B6
F610 B7
F611 B13
F612 B12
F613 B12
F614 D2
F615 D2
F616 B13
F617 B7
F618 E2
F619 C10
F620 C12
F621 C6
F622 C10
F623 E2
F624 C9
F625 C12
F626 D10
F627 F3
F628 E7
F629 D9
F630 D12
F631 D2
F632 B3
F633 E12
F634 E3
F635 E11
F636 E2
F637 E11
F638 E11
F639 E8
F640 E11
F641 E11
F643 F10
F644 E11
F646 F11
F647 F9
F648 F10
F649 F11
F651 G9
F652 G9
F653 G11
F654 H8
F655 H9
F656 H13
F657 H11
F658 H13
F659 H13
F660 I8
F661 I9
F662 I10
F663 I8
F664 I9
F665 I12
F669 C11
F670 E2
F671 I1
F672 I2
F673 I2
F674 I3
F675 F2
F921 A13
F922 A13
F923 A13
F924 A13
F925 B13
F926 B13
F927 G2
F928 G2
F929 H2

Mono board: SD RAM's



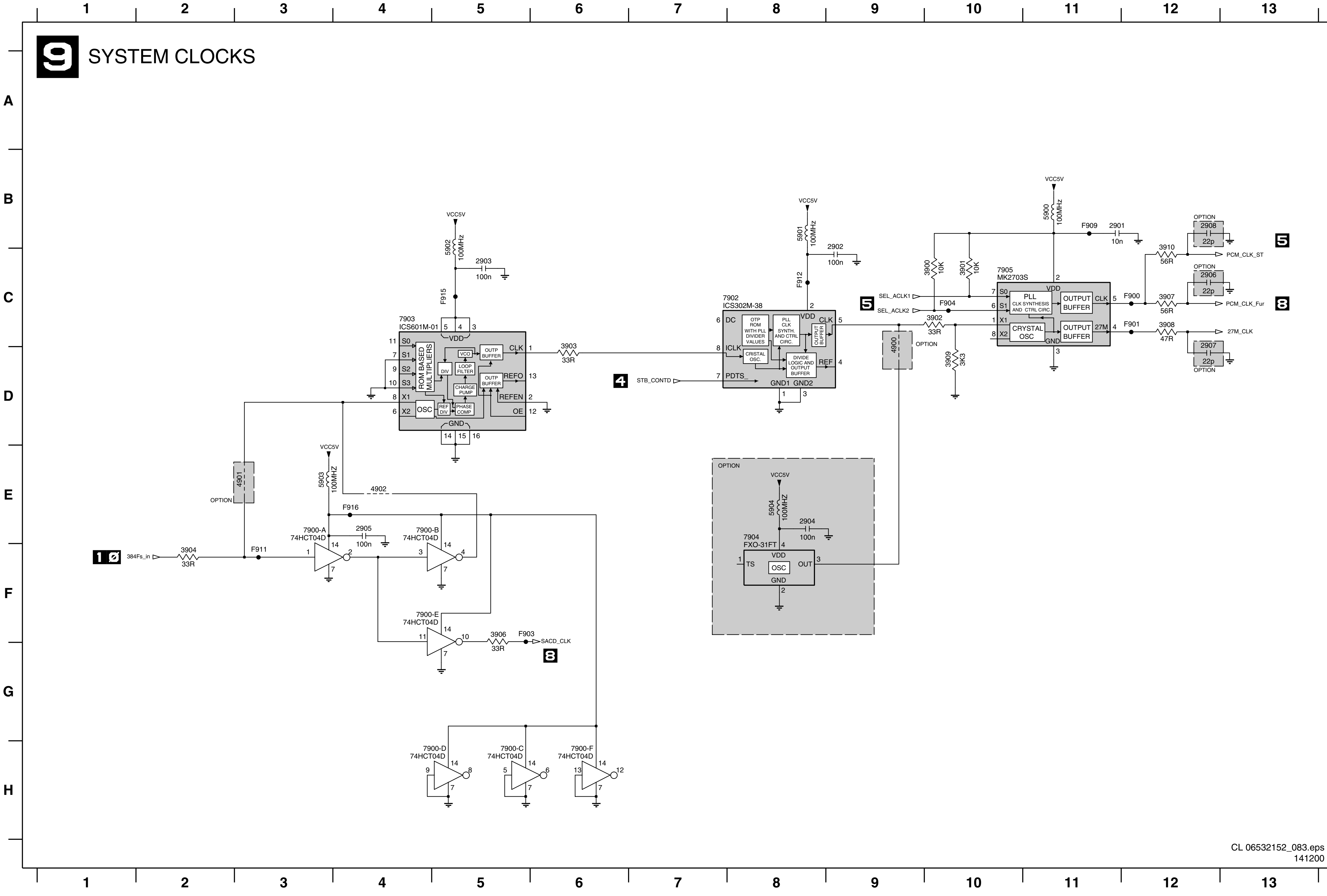
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2402 C3
2403 C5
2404 C6
2406 C2
2407 C3
2408 C5
2409 C6
2410 C2
2411 C3
2412 C5
2413 C6
2419 I2
2420 I3
2700 C11
2701 C13
2702 D11
2703 D13
2704 D11
2705 D13
2706 D13
2707 C12
3403 F1
3404 F4
3702 E10
5403 I2
5700 C12
7404 D2
7405 D5
7700 D11
F415 F1
F416 F4
F420 I3
F700 E10
F701 E10
F702 E10
F703 C11

Mono board: SACD decoder



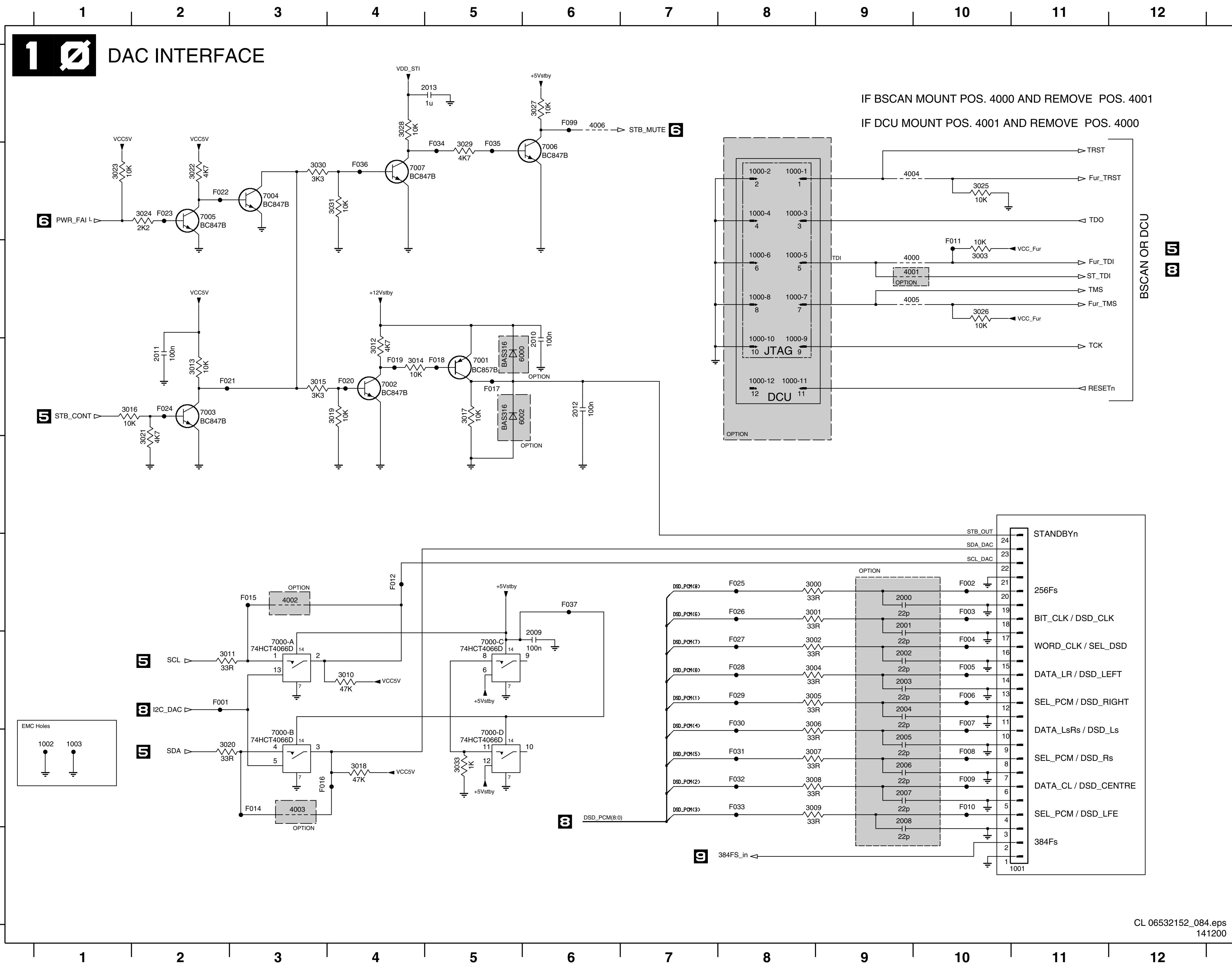
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2801 A2
2802 A2
2803 A3
2804 A3
2805 A3
2806 A3
2807 A3
2808 A3
2809 A3
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2811 A4
2812 A4
2813 A4
2814 A4
2815 A4
2816 A4
2817 A5
2818 A5
2819 A5
2820 A5
2821 A5
2822 A5
2823 E2
2824 E2
2825 E2
2826 E2
2827 G5
2828 G4
2829 H7
2830 H7
2831 I7
2832 F1
2833 F5
2834 E14
3800 B8
3801 E5
3802 F4
3805 G2
3806 G4
3807 H4
3808 H2
3809 I2
3810 I2
3811 I2
3812 F2
3813 G2
3814 G2
3815 E11
3816 H2
4801 D12
4802 D11
4803 F13
5800 A2
5801 E2
5802 E2
7800 C6
7801 F2
7802 E13
F800 B9
F801 B9
F802 B9
F803 B9
F804 B10
F805 B10
F806 B10
F807 B10
F808 B10
F809 B10
F810 D11
F811 D11
F812 E11
F813 F5
F814 F5
F815 F6
F816 F6
F817 G6
F818 G6
F819 G6
F820 G6
F821 H7
F822 E5
F823 E4
F824 E4
F825 E4
F826 E4
F827 E2
F828 E2
F829 A5
F830 I10
F831 I10
F832 I10
F833 I10
F834 I10
F835 G3
F836 D11
F837 D11
F838 D11
F839 D11
F840 F3
F841 F3
F842 F3
F843 H8
F845 H7
F846 H7
F847 H7
F848 G6
F849 G4
F850 B8
F851 G5
F852 E11
F855 F2
F920 F4

Mono board: System clocks



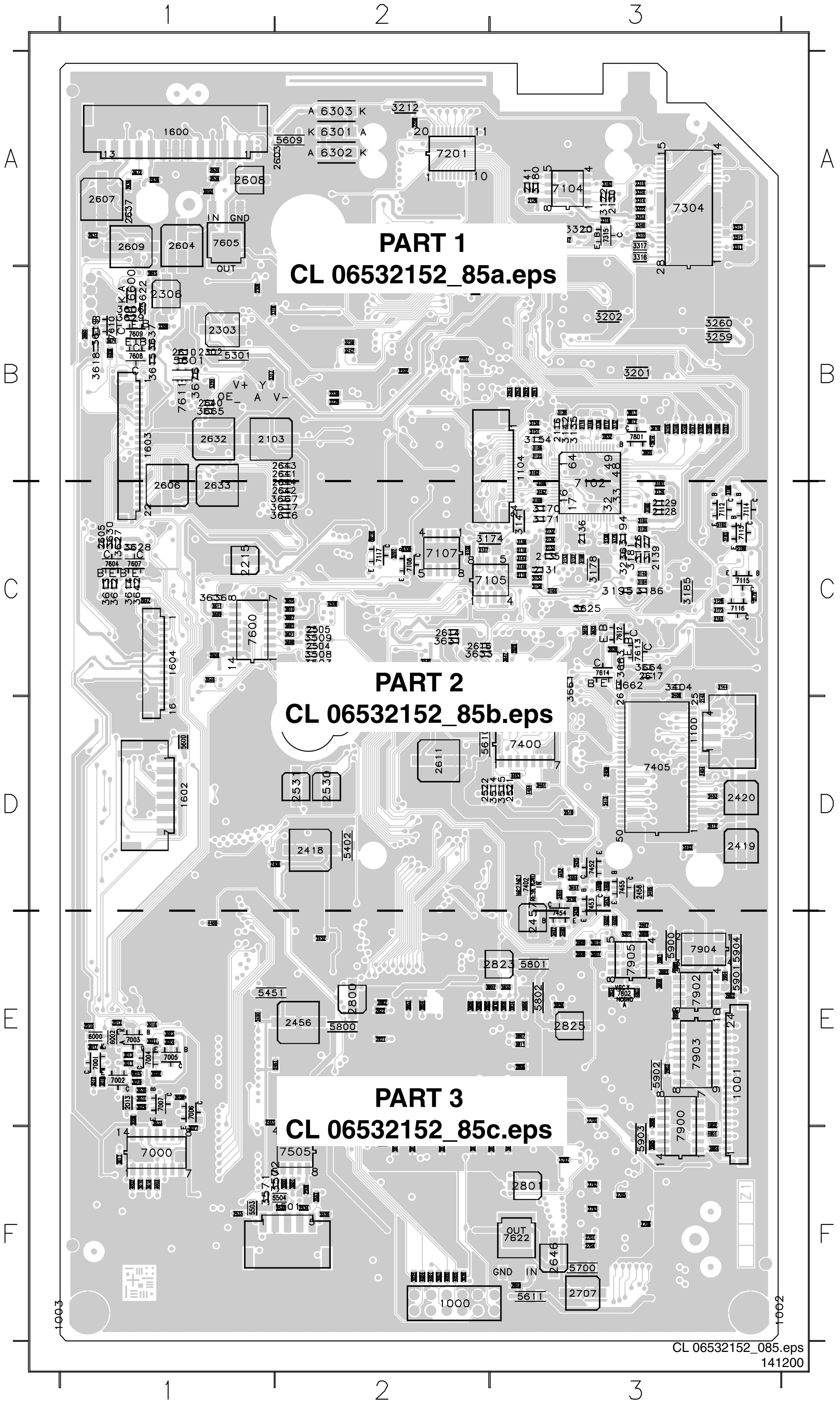
2901 B11
2902 C9
2903 C5
2904 E8
2905 E4
2906 C12
2907 D12
2908 B12
3900 C10
3901 C10
3902 C10
3903 D6
3904 F2
3906 F5
3907 C12
3908 C12
3909 D10
3910 C12
4900 C9
4901 E3
4902 E4
5900 B11
5901 B8
5902 B5
5903 E3
5904 E8
7900-A E3
7900-B E4
7900-C H5
7900-D H4
7900-E F4
7900-F H6
7902 C7
7903 C4
7904 E8
7905 C10
F900 C12
F901 C12
F903 F5
F904 C10
F909 B11
F911 F3
F912 C8
F915 C5
F916 E4

Mono board: DAC interface



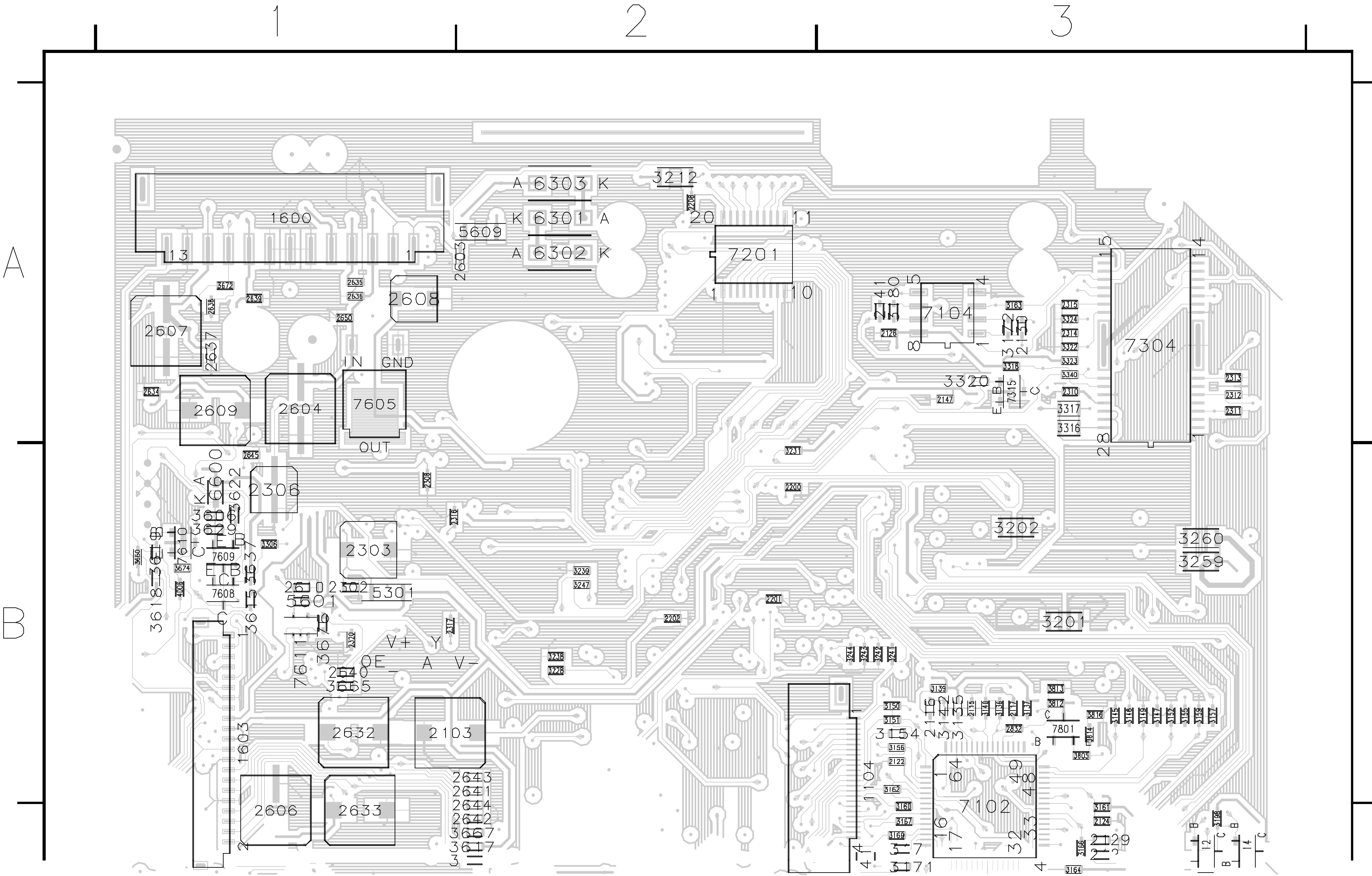
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1000-10 D8	F033 H8
1000-11 D8	F034 B5
1000-12 D8	F035 B5
1000-2 B8	F036 B4
1000-3 B8	F037 F6
1000-4 B8	F099 A6
1000-5 C8	
1000-6 C8	
1000-7 C8	
1000-8 C8	
1000-9 D8	
1001 I10	
1002 H1	
1003 H1	
2000 F9	
2001 F9	
2002 G9	
2003 G9	
2004 G9	
2005 H9	
2006 H9	
2007 H9	
2008 H9	
2009 G6	
2010 D6	
2011 D2	
2012 D6	
2013 A5	
3000 F8	
3001 F8	
3002 G8	
3003 C10	
3004 G8	
3005 G8	
3006 G8	
3007 H8	
3008 H8	
3009 H8	
3010 G4	
3011 G2	
3012 D4	
3013 D2	
3014 D4	
3015 D3	
3016 D1	
3017 D5	
3018 H4	
3019 D4	
3020 H2	
3021 E2	
3022 B2	
3023 B1	
3024 B2	
3025 B10	
3026 C10	
3027 A6	
3028 A4	
3029 B5	
3030 B3	
3031 B4	
3033 H5	
4000 C9	
4001 C9	
4002 F3	
4003 H3	
4004 B9	
4005 C9	
4006 A6	
6000 D5	
6002 D5	
7000-A G3	
7000-B H3	
7000-C G5	
7000-D H5	
7001 D5	
7002 D4	
7003 D2	
7004 B3	
7005 B2	
7006 B6	
7007 B4	
F001 G2	
F002 F10	
F003 F10	
F004 G10	
F005 G10	
F006 G10	
F007 G10	
F008 H10	
F009 H10	
F010 H10	
F011 C10	
F012 F4	
F014 H3	
F015 F3	
F016 H3	
F017 D5	
F018 D5	
F019 D4	
F020 D4	
F021 D2	
F022 B2	
F023 B2	
F024 D2	
F025 F8	
F026 F8	
F027 G8	
F028 G8	
F029 G8	
F030 G8	
F031 H8	

Layout Mono board: (overview top side)



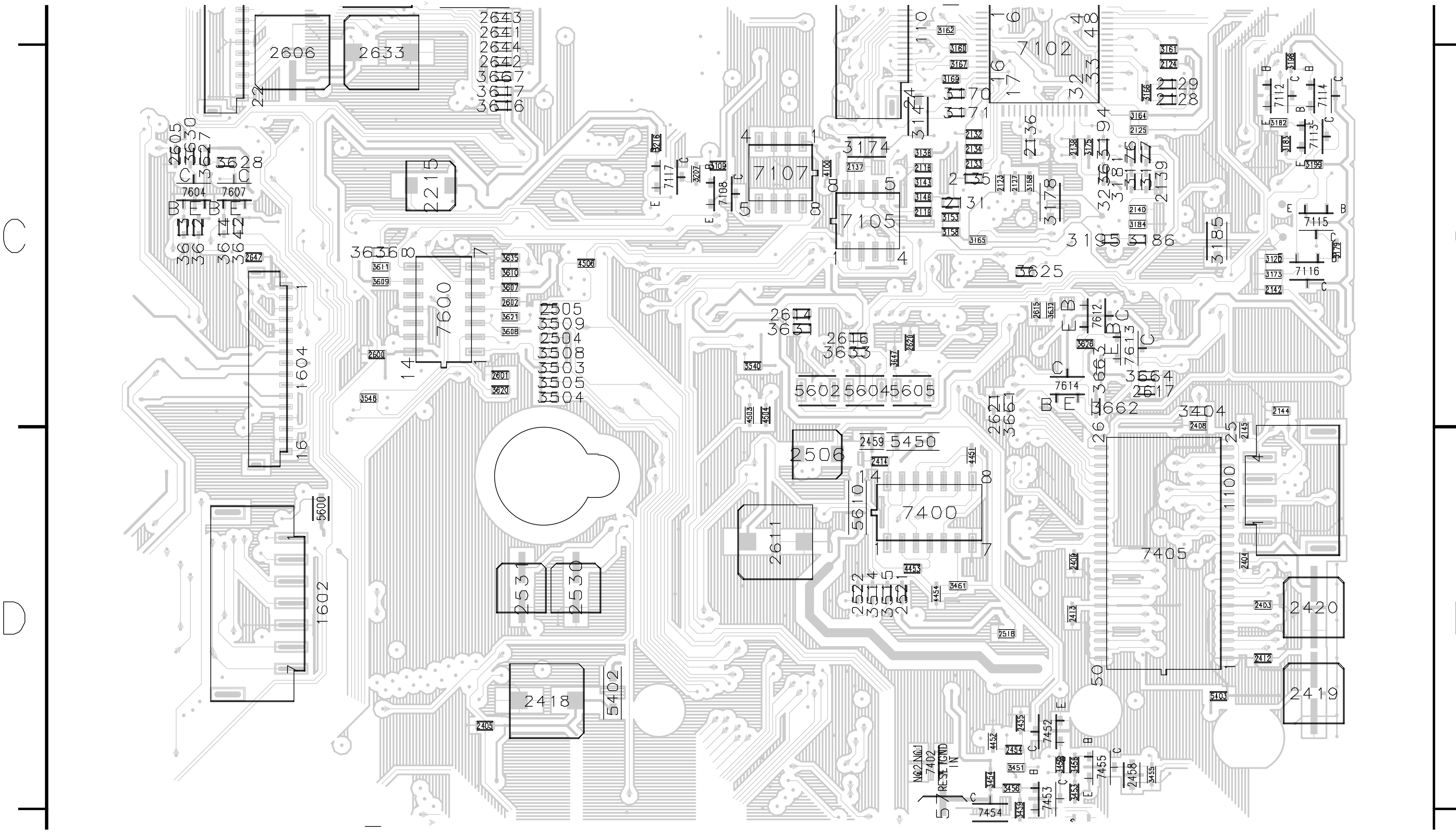
1001	E3	2642	C2	3180	A3	3910	E3
1100	D3	2643	B2	3181	C3	4000	F2
1104	B3	2644	C2	3182	C3	4001	F2
1501	F2	2645	B1	3183	C3	4002	F1
1600	A1	2646	F3	3184	C3	4003	F1
1602	D1	2647	C1	3185	C3	4004	F2
1603	B1	2649	F3	3186	C3	4005	F2
1604	C1	2650	A1	3194	C3	4006	B1
2009	E1	2700	E3	3195	C3	4100	C2
2010	E1	2701	F3	3198	C3	4450	E1
2011	E1	2702	F3	3199	C3	4451	D3
2012	E1	2703	F3	3201	B3	4452	D3
2013	E1	2704	F3	3202	B3	4453	D3
2103	B1	2705	F3	3207	C2	4454	D3
2115	B3	2706	F3	3212	A2	4500	E3
2116	B3	2707	F3	3216	C2	4501	E3
2117	B3	2800	E2	3228	B2	4502	E3
2118	C3	2801	F3	3231	B2	4503	C2
2119	C3	2802	E2	3236	C3	4504	C2
2122	B3	2803	E2	3238	B2	4506	C2
2123	C3	2804	E2	3239	B2	4604	F2
2124	C3	2805	E2	3241	B3	4803	E3
2125	C3	2806	E3	3242	B3	4900	E3
2126	A3	2807	E3	3243	B3	4901	F3
2127	C3	2808	E3	3244	B3	4902	E3
2128	C3	2809	E3	3247	B2	5301	B1
2129	C3	2810	E3	3259	B3	5402	D2
2130	A3	2811	F3	3260	B3	5403	D3
2131	C3	2812	F3	3306	B1	5450	D3
2132	C3	2813	F3	3316	A3	5451	E1
2133	C3	2814	F3	3317	A3	5503	F1
2134	C3	2815	F2	3318	A3	5504	F2
2135	C3	2816	F2	3320	A3	5600	D1
2136	C3	2817	F2	3322	A3	5601	B1
2137	C2	2818	F2	3323	A3	5602	C2
2138	C3	2819	F2	3324	A3	5604	C3
2139	C3	2820	E2	3340	A3	5605	C3
2140	C3	2821	E2	3404	C3	5609	A2
2141	A3	2822	E2	3451	D3	5610	D2
2142	C3	2823	E3	3452	D3	5611	F3
2144	C3	2824	E3	3453	D3	5700	F3
2145	D3	2825	E3	3454	D3	5800	E2
2147	A3	2826	E3	3455	D3	5801	E3
2200	B2	2832	B3	3456	D3	5802	E3
2201	B2	2833	E3	3457	E3	5900	E3
2202	B2	2834	E3	3458	D3	5901	E3
2208	A2	2901	E3	3459	E3	5902	E3
2215	C1	2902	E3	3460	E3	5903	F3
2302	B1	2903	E3	3461	D3	5904	E3
2303	B1	2904	E3	3500	F2	6000	E1
2306	B1	2905	F3	3501	F2	6002	E1
2308	B1	2906	E3	3503	C2	6301	A2
2310	A3	2907	E3	3504	C2	6302	A2
2311	A3	2908	E3	3505	C2	6303	A2
2312	A3	3003	F2	3508	C2	6600	B1
2313	A3	3010	F1	3509	C2	7000	F1
2314	A3	3011	F1	3514	D3	7001	E1
2315	A3	3012	E1	3515	D3	7002	E1
2316	B1	3013	E1	3540	C2	7003	E1
2317	B1	3014	E1	3548	C1	7004	E1
2320	B1	3015	E1	3553	F2	7005	E1
2403	D3	3016	E1	3571	F1	7006	E1
2404	D3	3017	E1	3572	F2	7007	E1
2405	D2	3018	F1	3606	B1	7102	C3
2408	C3	3019	E1	3607	C2	7104	A3
2409	D3	3021	E1	3608	C2	7105	C3
2412	D3	3022	E1	3609	C1	7107	C2
2413	D3	3023	E1	3610	C2	7108	C2
2414	D3	3024	E1	3611	C1	7112	C3
2418	D2	3025	F2	3612	C1	7113	C3
2419	D3	3026	F2	3613	C1	7114	C3
2420	D3	3027	F1	3614	C1	7115	C3
2450	E1	3028	E1	3615	B1	7116	C3
2451	E2	3029	E1	3616	C2	7117	C2
2452	E2	3030	E1	3617	C2	7201	A2
2453	E1	3031	E1	3618	B1	7304	A3
2454	D3	3033	E1	3619	B1	7315	A3
2455	D3	3109	C2	3620	C2	7400	D3
2456	E2	3120	C3	3621	C2	7402	D3
2457	E3	3135	B3	3622	B1	7405	D3
2458	D3	3136	B3	3625	C3	7452	D3
2459	D3	3137	B3	3626	C3	7453	D3
2500	F2	3138	C3	3627	C1	7454	E3
2504	C2	3139	B3	3628	C1	7455	D3
2505	C2	3140	B3	3629	B1	7505	F2
2506	D2	3141	C3	3630	C1	7600	C1
2518	D3	3142	B3	3631	C2	7604	C1
2521	D3	3143	C3	3632	C3	7605	A1
2522	D2	3145	B3	3633	C2	7607	C1
2530	D2	3146	B3	3635	C2	7608	B1
2531	D2	3147	B3	3636	C1	7609	B1
2532	F2	3148	C3	3637	B1	7610	B1
2533	F1	3149	B3	3642	C1	7611	B1
2534	F2	3150	B3	3647	C3	7612	C3
2535	F2	3151	B3	3660	B1	7613	C3
2600	C1	3152	B3	3661	C3	7614	C3
2601	C2	3153	C3	3662	C3	7622	F3
2602	C2	3154	B3	3663	C3	7801	B3
2603	A2	3155	B3	3664	C3	7802	E3
2604	A1	3156	B3	3665	B1	7900	F3
2605	C1	3157	B3	3667	C2	7902	E3
2606	C1	3158	C3	3672	A1	7903	E3
2607	A1	3159	B3	3674	B1	7904	E3
2608	A1	3160	C3	3676	B1	7905	E3
2609	A1	3161	C3	3702	F3		
2610	B1	3162	B3	3802	E3		
2611	D2	3163	A3	3805	B3		
2614	C2	3164	C3	3806	E3		
2615	C3	3165	C3	3808	E2		
2616	C2	3166	C3	3809	E2		
2617	C3	3167	C3	3810	E3		
2620	C3	3168	C3	3811	E3		
2621	C3	3169	C3	3812	B3		
2632	B1	3170	C3	3813	B3		
2633	C1	3171	C3	3814	B3		
2634	A1	3172	A3	3816	B3		
2635	A1	3173	C3	3902	E3		
2636	A1	3174	C3	3903	E3		
2637	A1	3175	C3	3904	F3		
2638	A1	3176	C3	3906	E3		
2639	A1	3177	C3	3907	E3		
2640	B1	3178	C3	3908	E3		
2641	B2	3179	C3	3909	E3		

Layout Mono board: (Part 1 top side)



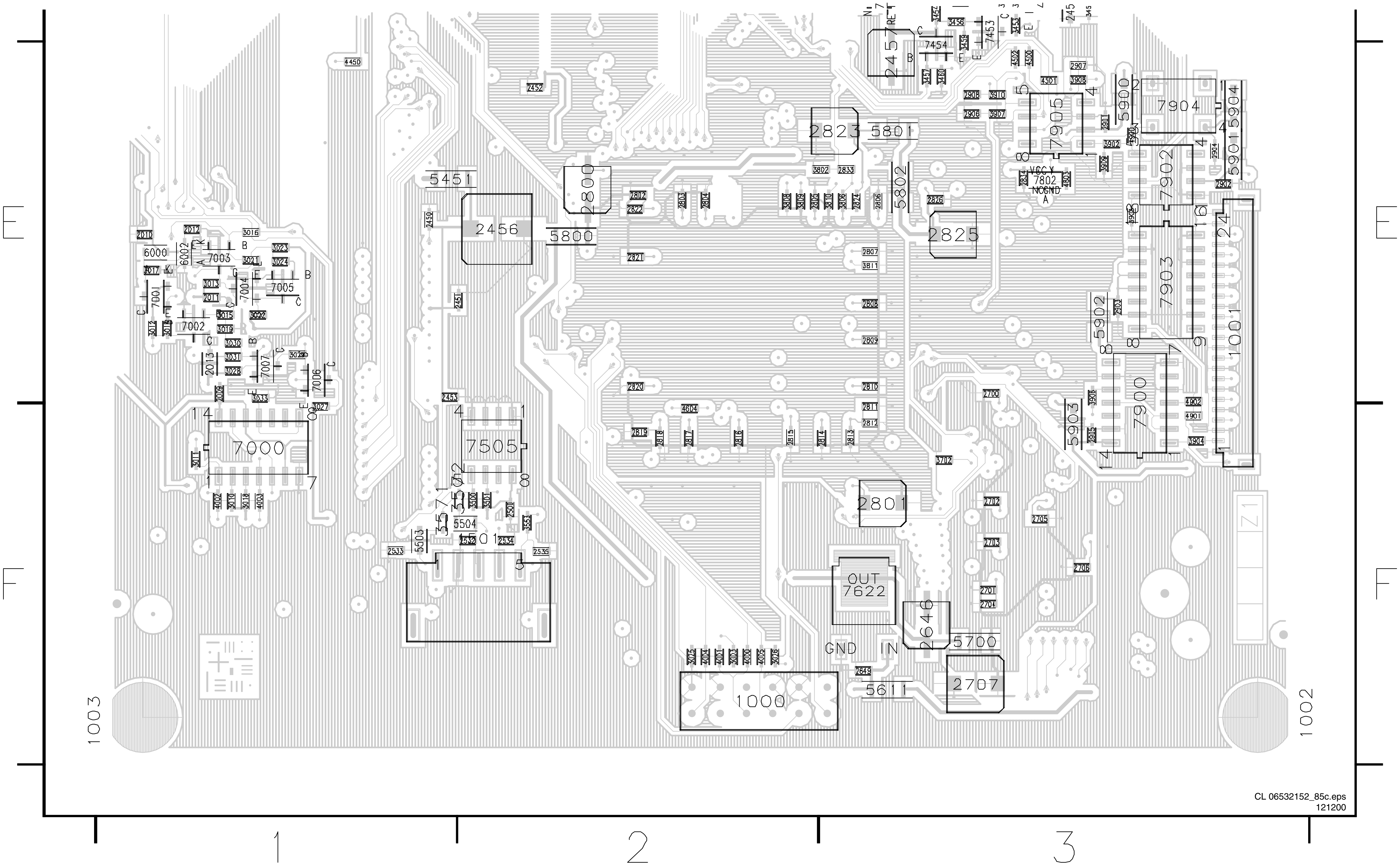
CL 06532152_85a.eps
121200

Layout Mono board: (Part 2 top side)

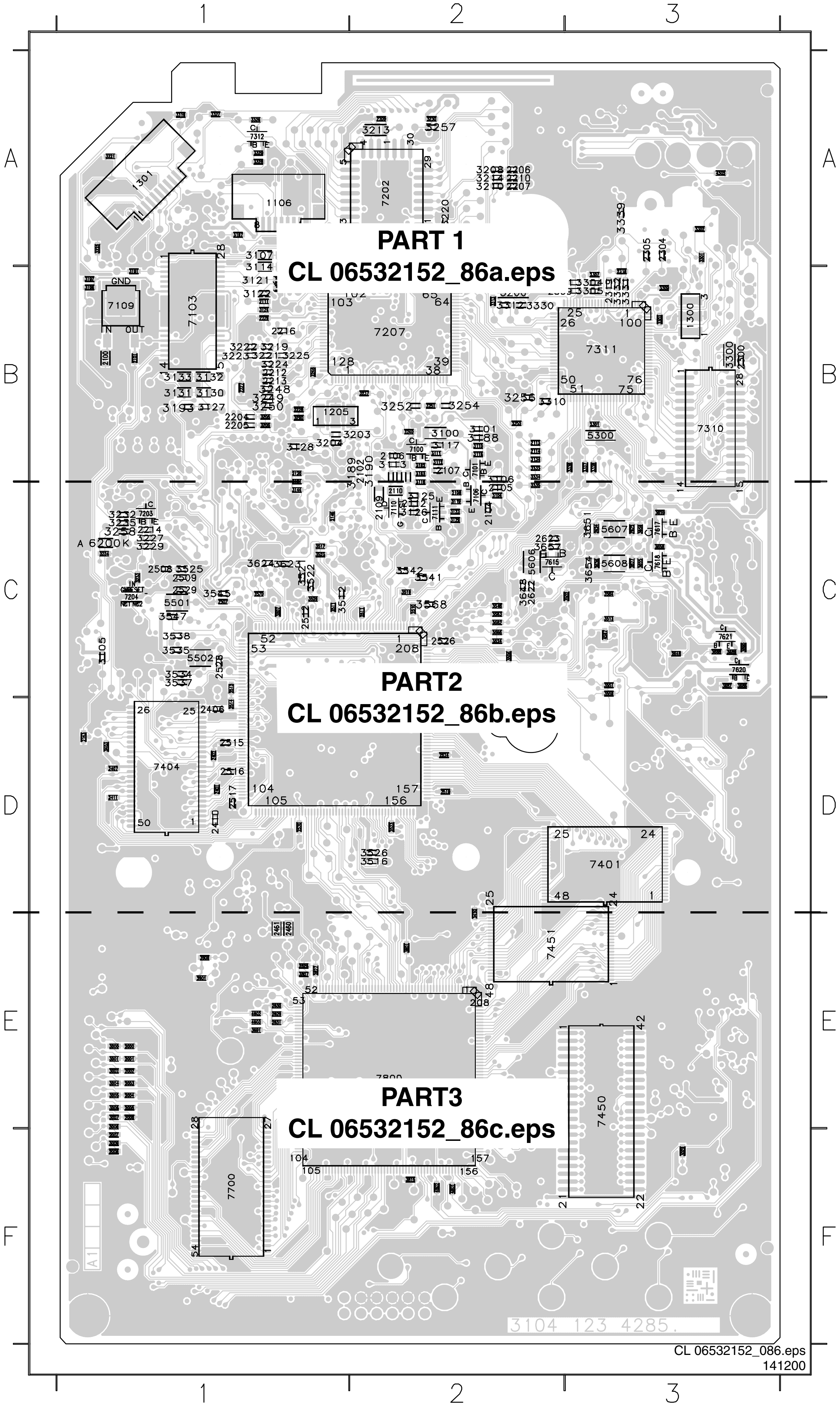


CI 06532152_85b.eps
121200

Layout Mono board: (Part 3 top side)

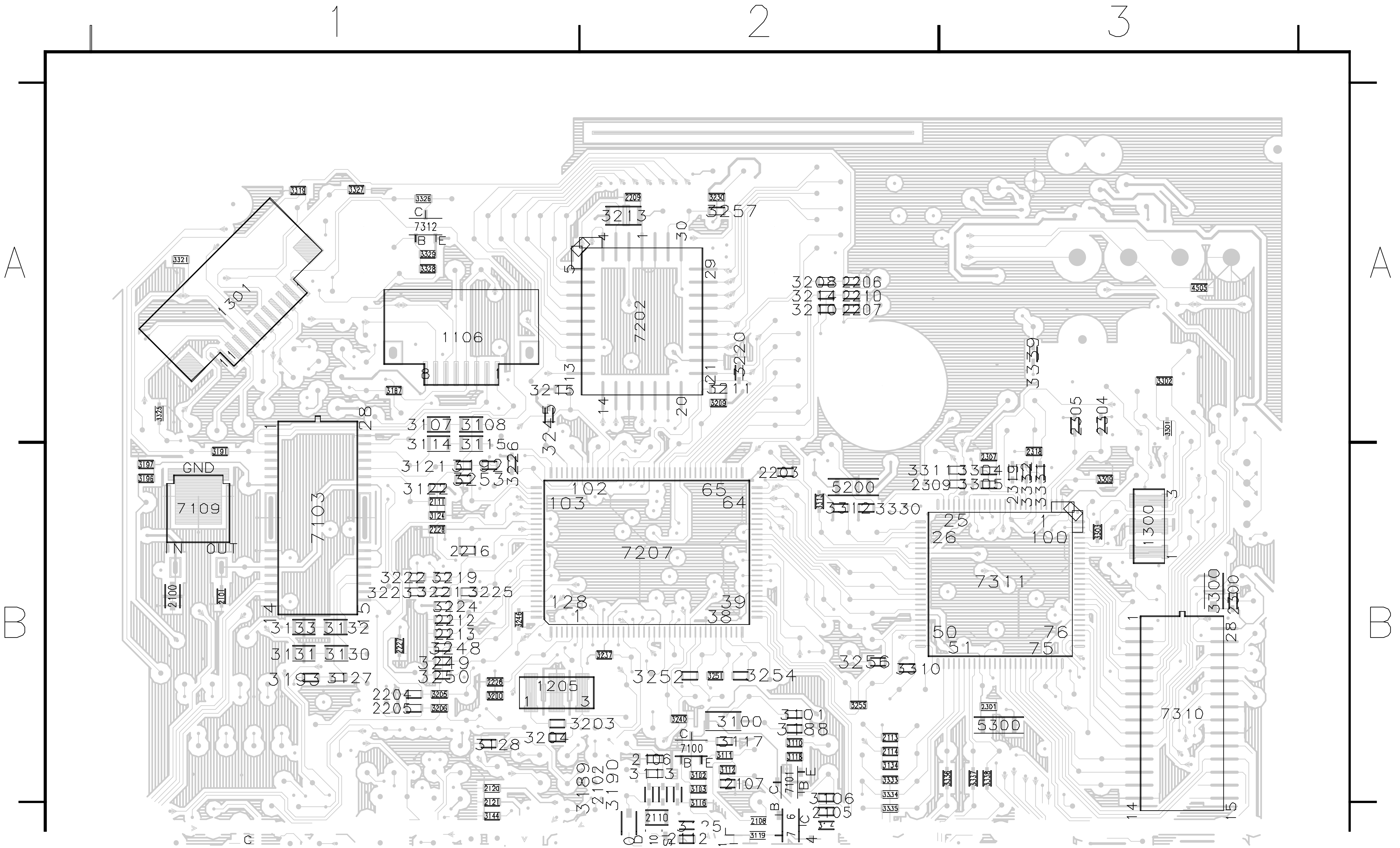


Layout Mono board: (overview bottom side)



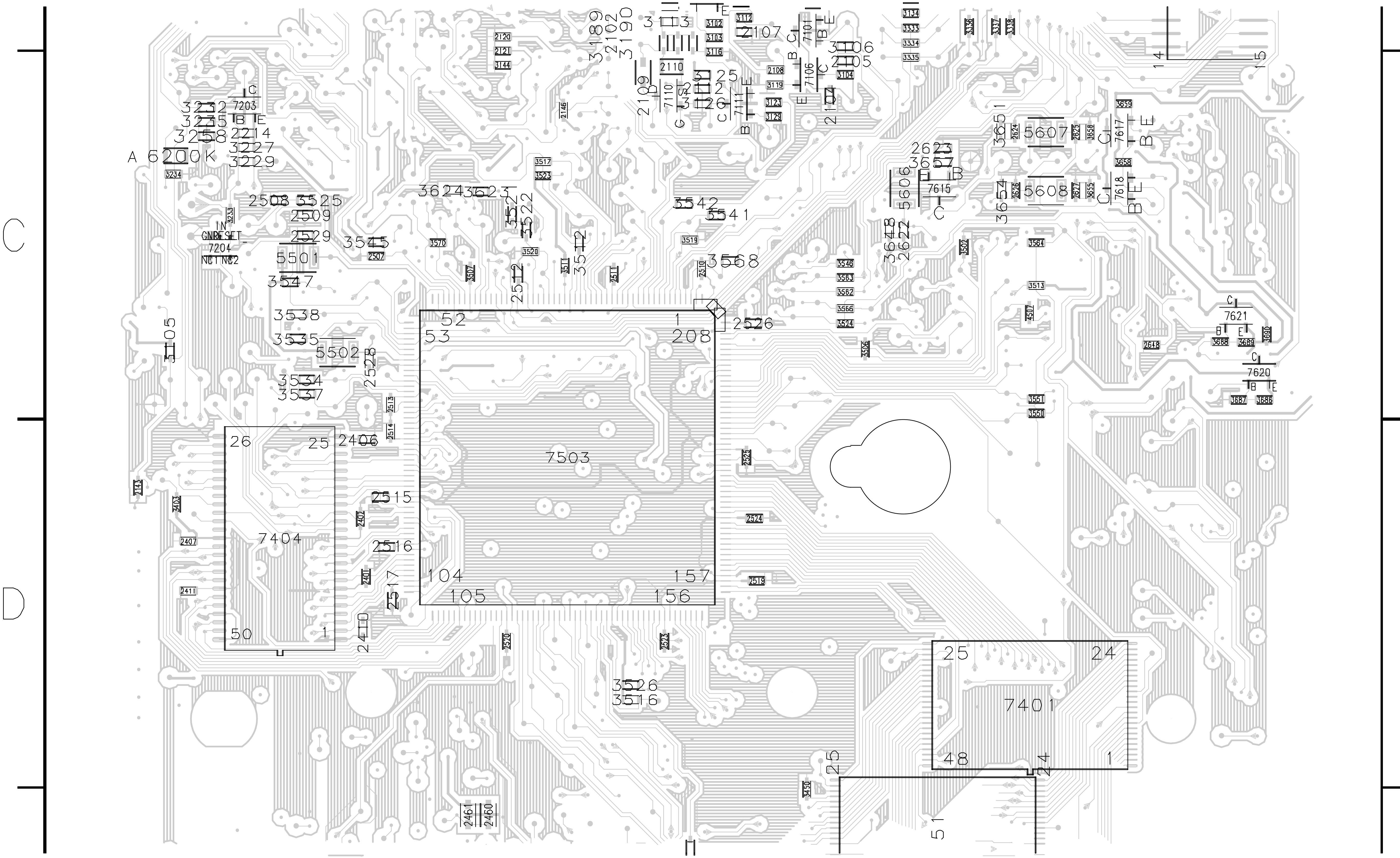
Item	Location
1106	A1
1205	B1
1300	B3
1301	A1
2000	E1
2001	E1
2002	E1
2003	E1
2004	E1
2005	E1
2006	E1
2007	F1
2008	F1
2100	B1
2101	B1
2102	B2
2104	C2
2105	C2
2106	B2
2107	B2
2108	C2
2109	C2
2110	C2
2111	B1
2112	C2
2113	B2
2114	B2
2120	B1
2121	C1
2143	D1
2146	C1
2203	B2
2204	B1
2205	B1
2206	A2
2207	A2
2209	A2
2210	A2
2212	B1
2213	B1
2214	C1
2216	B1
2226	B1
2227	B1
2228	B1
2300	B3
2301	B3
2304	A3
2305	A3
2307	B3
2309	B2
2318	B3
2319	B3
2401	D1
2402	D1
2406	D1
2407	D1
2410	D1
2411	D1
2460	E1
2461	E1
2507	C1
2508	C1
2509	C1
2510	C2
2511	C2
2512	C1
2513	C1
2514	D1
2515	D1
2516	D1
2517	D1
2519	D2
2520	D1
2523	D2
2524	D2
2525	D2
2526	C2
2528	C1
2529	C1
2622	C2
2623	C2
2624	C3
2625	C3
2626	C3
2627	C3
2648	C3
2827	E1
2828	E1
2829	E1
2830	E1
2831	E1
3000	E1
3001	E1
3002	E1
3004	E1
3005	E1
3006	E1
3007	E1
3008	E1
3009	F1
3020	F3
3100	B2
3101	B2
3102	B2
3103	B2
3104	C2
3105	C1
3106	B2
3107	A1
3108	A1
3110	B2
3111	B2
3112	B2
3113	B2
3114	B1
3115	B1
3116	C2
3117	B2
3118	B2
3119	C2
3121	B1
3122	B1
3123	C2
3124	B1
3125	C2
3126	C2
3127	B1
3128	B1
3129	C2
3130	B1
3131	B1
3132	B1
3133	B1
3134	B2
3144	C1
3187	A1
3188	B2
3189	B2
3190	B2
3191	B1
3192	B1
3193	B1
3196	B1
3197	B1
3200	B1
3203	B2
3204	B1
3205	B1
3206	B1
3208	A2
3209	A2
3210	A2
3211	A2
3213	A2
3214	A2
3215	A1
3219	B1
3220	A2
3221	B1
3222	B1
3223	B1
3224	B1
3225	B1
3226	B1
3227	C1
3229	C1
3230	A2
3232	C1
3233	C1
3234	C1
3235	C1
3237	B2
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3246	B1
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3255	B2
3256	B2
3257	A2
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3301	A3
3302	A3
3303	B3
3304	B3
3305	B3
3309	B3
3310	B2
3311	B2
3312	B2
3313	B2
3319	A1
3321	A1
3325	A1
3326	A1
3327	A1
3328	A1
3329	A1
3330	B2
3331	B3
3332	B3
3333	B2
3334	B2
3335	C2
3336	B3
3337	B3
3338	B3
3339	A3
3403	D1
3450	E2
3502	C3
3506	C2
3507	C1
3511	C1
3512	C1
3513	C3
3516	D2
3517	C1
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3521	C1
3522	C1
3523	C1
3524	C2
3525	C1
3526	D2
3534	C1
3535	C1
3537	C1
3538	C1
3541	C2
3542	C2
3545	C1
3546	C2
3547	C1
3550	C3
3551	C3
3562	C2
3563	C2
3564	C3
3566	C2
3568	C2
3570	C1
3623	C1
3624	C1
3648	C2
3651	C3
3654	C3
3655	C3
3656	C3
3657	C2
3658	C3
3659	C3
3686	C3
3687	C3
3688	C3
3689	C3
3690	C3
3691	E1
3800	E2
3801	E2
3807	E1
3815	F2
3900	E1
3901	E1
4505	A3
4507	C3
4602	E1
4603	E1
4801	F2
4802	F2
5200	B2
5300	B3
5501	C1
5502	C1
5606	C2
5607	C3
5608	C3
6200	C1
7100	B2
7101	B2
7103	B1
7106	C2
7109	B1
7110	C2
7111	C2
7202	A2
7203	C1
7204	C1
7207	B2
7310	B3
7311	B3
7312	A1
7401	D3
7404	D1
7450	E3
7451	E2
7503	D1
7615	C2
7617	C3
7618	C3
7620	C3
7621	C3
7700	F1
7800	E2

Layout Mono board: (Part 1 bottom side)



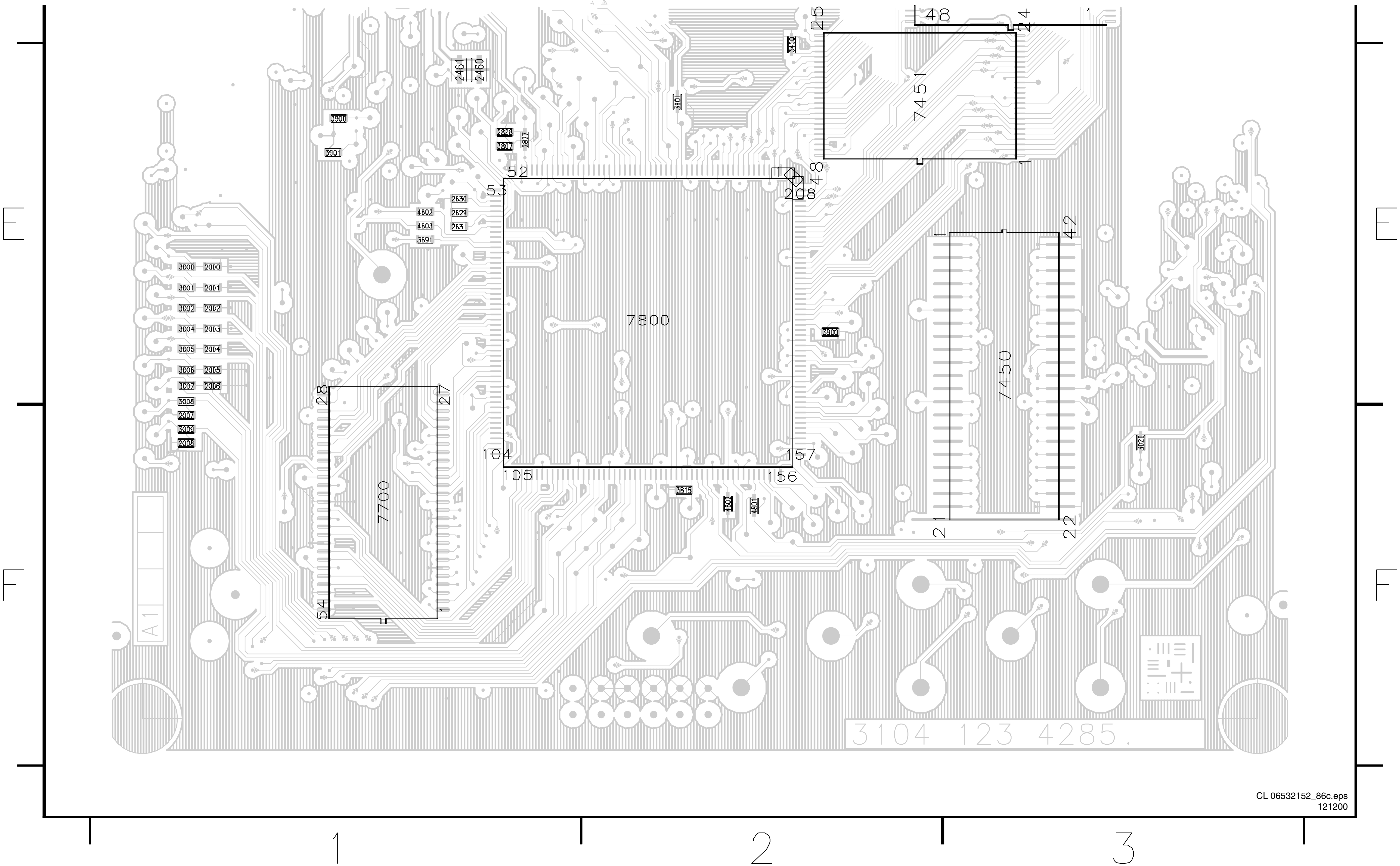
CL 06532152_86a.eps
121200

Layout Mono board: (Part 2 bottom side)



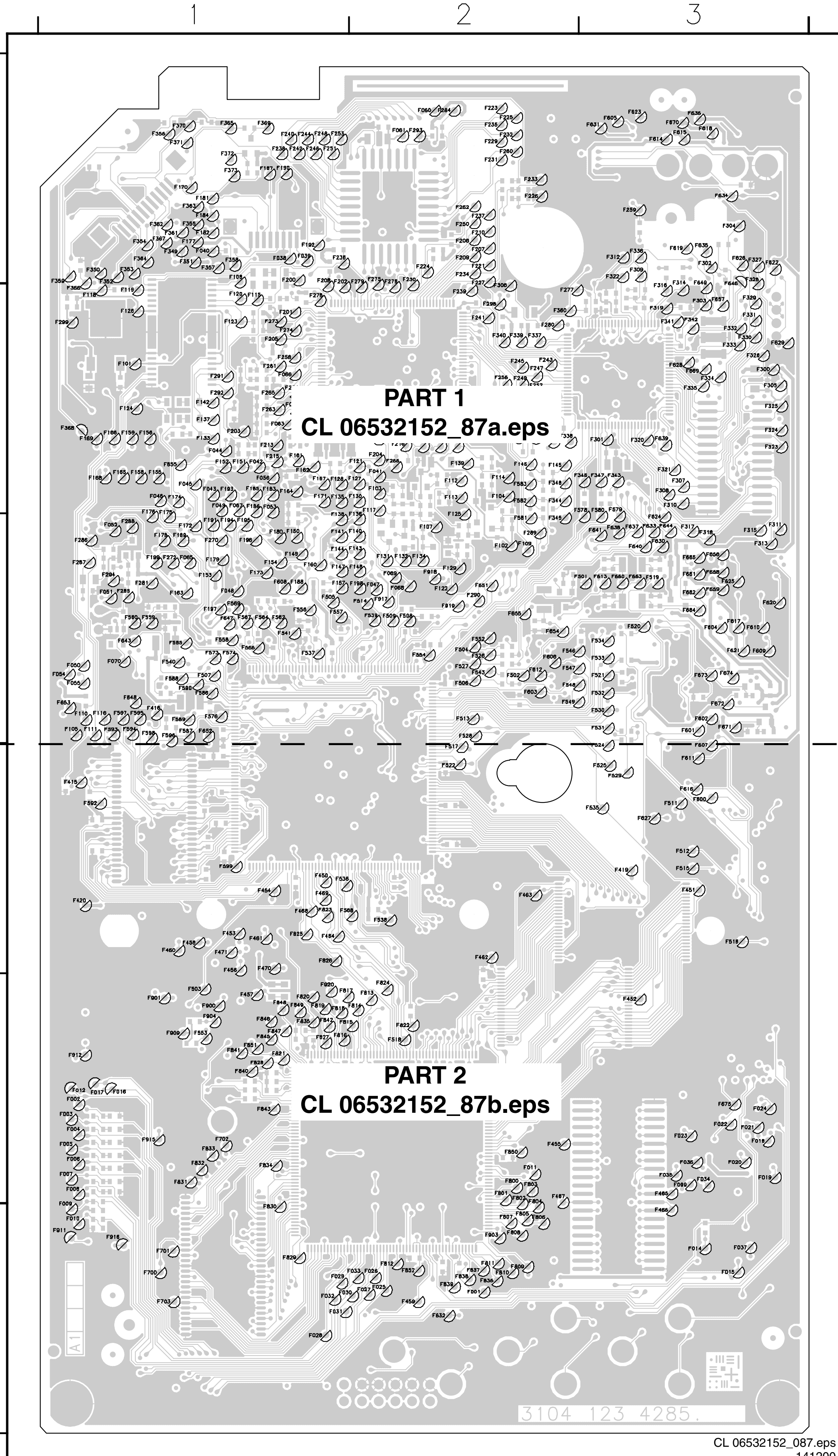
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121200

Layout Mono board: (Part 3 bottom side)



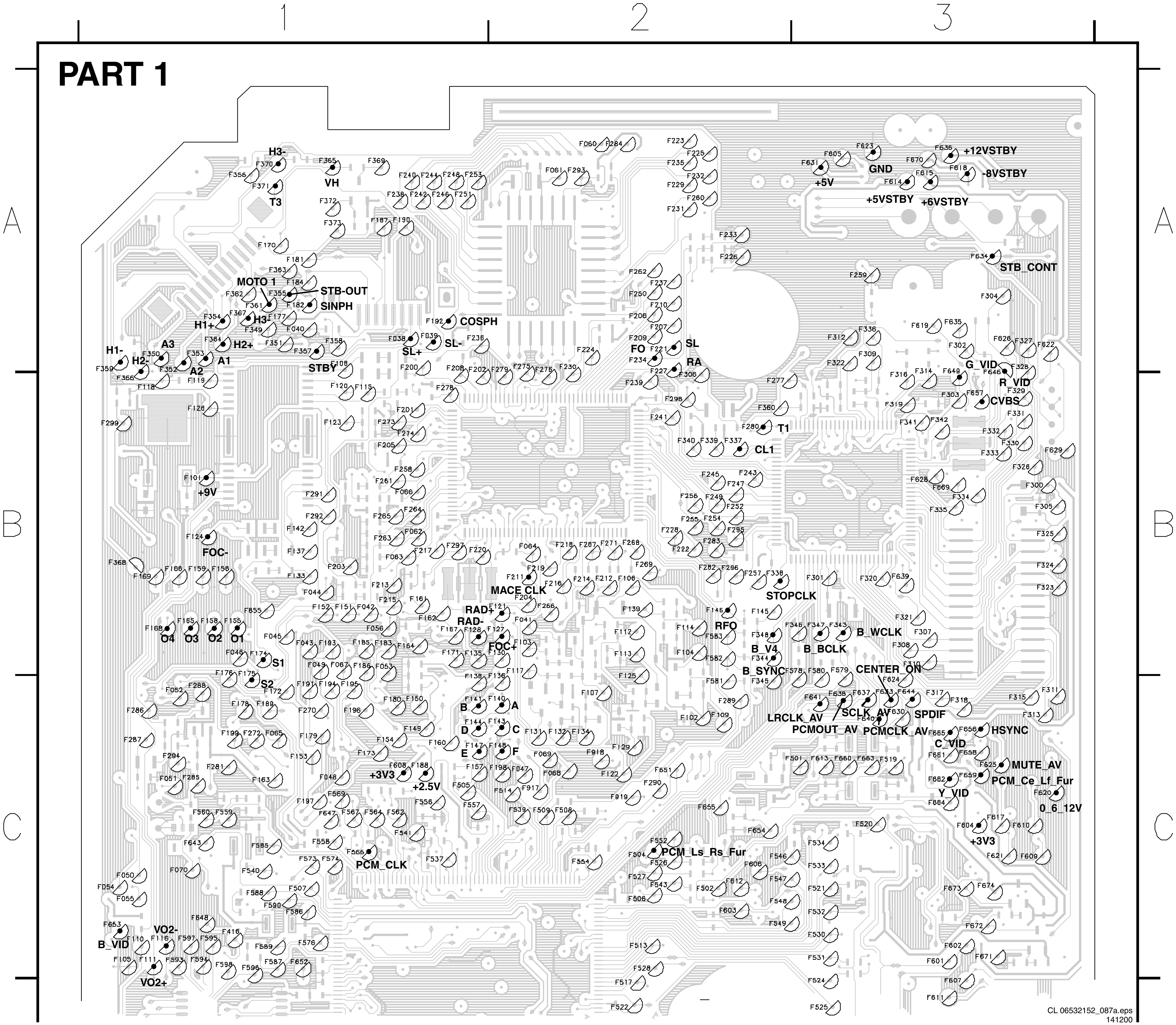
CL 06532152_86c.eps
121200

Layout Mono board: (overview testpoints)

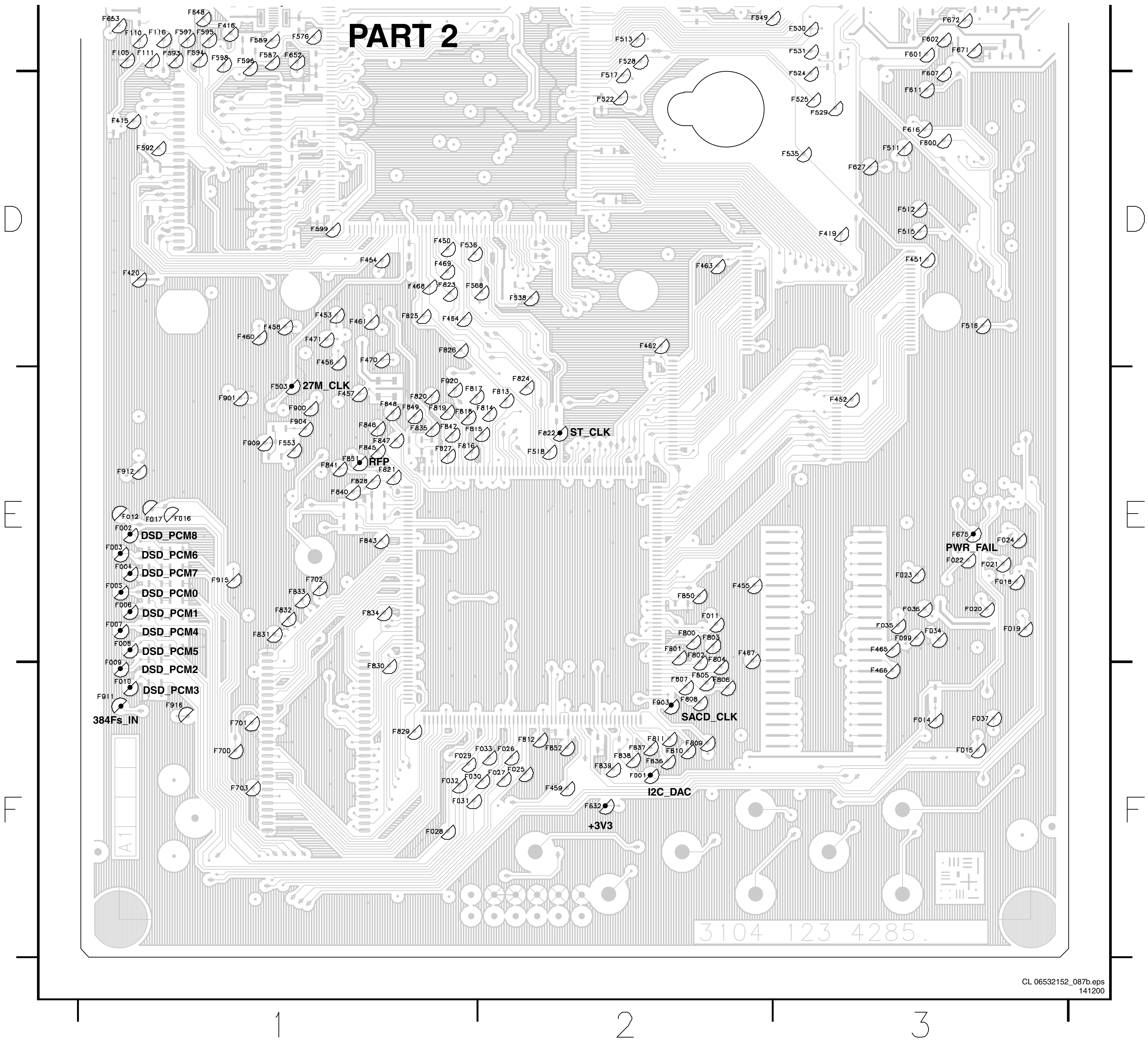


F001	F2	F157	C1	F280	B2	F505	C1	F643	C1
F002	E1	F158	B1	F281	C1	F506	C2	F644	C3
F003	E1	F159	B1	F282	B2	F507	C1	F646	A3
F004	E1	F160	C1	F283	B2	F508	C2	F647	C1
F005	E1	F161	B1	F284	A2	F509	C2	F648	C1
F006	E1	F162	B1	F285	C1	F511	D3	F649	B3
F007	E1	F163	C1	F286	C1	F512	D3	F651	C2
F008	E1	F164	B1	F287	C1	F513	C2	F652	C1
F009	F1	F165	B1	F288	C1	F514	C2	F653	C1
F010	F1	F166	B1	F289	C2	F515	D3	F654	C2
F011	E2	F167	B1	F290	C2	F516	D3	F655	C2
F012	E1	F168	B1	F291	B1	F517	D2	F656	C3
F014	F3	F169	B1	F292	B1	F518	E2	F657	B3
F015	F3	F170	A1	F293	A2	F519	C3	F658	C3
F016	E1	F171	B1	F294	C1	F520	C3	F659	C3
F017	E1	F172	C1	F295	B2	F521	C3	F660	C3
F018	E3	F173	C1	F296	B2	F522	D2	F661	C3
F019	E3	F174	B1	F297	B1	F524	D3	F662	C3
F020	E3	F175	C1	F298	B2	F525	D3	F663	C3
F021	E3	F176	C1	F299	B1	F526	C2	F664	C3
F022	E3	F177	A1	F300	B3	F527	C2	F665	C3
F023	E3	F178	C1	F301	B3	F528	C2	F669	B3
F024	E3	F179	C1	F302	A3	F529	D3	F670	A3
F025	F2	F180	C1	F303	B3	F530	C3	F671	C3
F026	F2	F181	A1	F304	A3	F531	C3	F672	C3
F027	F2	F182	A1	F305	B3	F532	C3	F673	C3
F028	F1	F183	B1	F306	B2	F533	C3	F674	C3
F029	F1	F184	A1	F307	B3	F534	C3	F675	E3
F030	F2	F185	B1	F308	B3	F535	D3	F700	F1
F031	F1	F186	B1	F309	A3	F536	D1	F701	F1
F032	F1	F187	A1	F310	B3	F537	C1	F702	E1
F033	F2	F188	C1	F311	C3	F538	D2	F703	F1
F034	E3	F189	C1	F312	A3	F539	C2	F800	E2
F035	E3	F190	A1	F313	C3	F540	C1	F801	E2
F036	E3	F191	C1	F314	B3	F541	C1	F802	E2
F037	F3	F192	A1	F315	C3	F542	A3	F803	E2
F038	A1	F193	B1	F316	B3	F543	C2	F804	F2
F039	A1	F194	C1	F317	C3	F544	A3	F805	F2
F040	A1	F195	C1	F318	C3	F545	A3	F806	F2
F041	B2	F196	C1	F319	B3	F546	C2	F807	F2
F042	B1	F197	C1	F320	B3	F547	C2	F808	F2
F043	B1	F198	C2	F321	B3	F548	C2	F809	F2
F044	B1	F199	C1	F322	A3	F549	C2	F810	F2
F045	B1	F200	A1	F323	B3	F552	C2	F811	F2
F046	B1	F201	B1	F324	B3	F553	E1	F812	F2
F047	C2	F202	B1	F325	B3	F554	C2	F813	E2
F048	C1	F203	B1	F326	B3	F555	A3	F814	E2
F049	B1	F204	B2	F327	A3	F556	C1	F815	E2
F050	C1	F205	B1	F328	A3	F557	C1	F816	E1
F051	C1	F206	A2	F329	B3	F558	C1	F817	E1
F052	C1	F207	A2	F330	B3	F559	C1	F818	E1
F053	B1	F208	B1	F331	B3	F560	C1	F819	E1
F054	C1	F209	A2	F332	B3	F562	C1	F820	E1
F055	C1	F210	A2	F333	B3	F564	C1	F821	E1
F056	B1	F211	B2	F334	B3	F566	C1	F822	E2
F060	A2	F212	B2	F335	B3	F567	C1	F823	D1
F061	A2	F213	B1	F336	A3	F568	D2	F824	E2
F062	B1	F214	B2	F337	B2	F569	C1	F825	D1
F063	B1	F215	B1	F338	B2	F573	C1	F826	D1
F064	B2	F216	B2	F339	B2	F574	C1	F827	E1
F065	C1	F217	B1	F340	B2	F576	C1	F828	E1
F066	B1	F218	B2	F341	B3	F578	C3	F829	F1
F067	B1	F219	B2	F342	B3	F579	C3	F830	F1
F068	C2	F220	B1	F343	B3	F580	C3	F831	E1
F069	C2	F221	A2	F344	B2	F581	C2	F832	E1
F070	C1	F222	B2	F345	C2	F582	B2	F833	E1
F099	E3	F223	A2	F346	B3	F583	B2	F834	E1
F101	B1	F224	A2	F347	B3	F585	C1	F835	E1
F102	C2	F225	A2	F348	B2	F586	C1	F836	F2
F103	B2	F226	A2	F349	A1	F587	C1	F837	F2
F104	B2	F227	A2	F350	A1	F588	C1	F838	F2
F105	C1	F228	B2	F351	A1	F589	C1	F839	F2
F106	B2	F229	A2	F352	A1	F590	C1	F840	E1
F107	C2	F230	B2	F353	A1	F592	D1	F841	E1
F108	A1	F231	A2	F354	A1	F593	C1	F842	E1
F109	C2	F232	A2	F355	A1	F594	C1	F843	E1
F110	C1	F233	A2	F356	A1	F595	C1	F845	E1
F111	C1	F234	A2	F357	A1	F596	C1	F846	E1
F112	B2	F235	A2	F358	A1	F597	C1	F847	E1
F113	B2	F236	A1	F359	A1	F598	C1	F848	E1
F114	B2	F237	A2	F360	B2	F599	D1	F849	E1
F115	B1	F238	A1	F361	A1	F600	D3	F850	E2
F116	C1	F239	B2	F362	A1	F601	C3	F851	E1
F117	B2	F240	A1	F363	A1	F602	C3	F852	F2
F118	B1	F241	B2	F364	A1	F603	C2	F855	B1
F119	B1	F242	A1	F365	A1	F604	C3	F900	E1
F120	B1	F243	B2	F366	A1	F605	A3	F901	E1
F121	B2	F244	A1	F367	A1	F606	C2	F903	F2
F122	C2	F245	B2	F369	A1	F607	D3	F904	E1
F123	B1	F246	A1	F370	A1	F608	C1	F909	E1
F124	B1	F247	B2	F371	A1	F609	C3	F911	F1
F125	C2	F248	A1	F372	A1	F610	C3	F912	E1
F126	B1	F249	B2	F373	A1	F611	D3	F915	E1
F127	B2	F250	A2	F415	D1	F612	C2	F916	F1
F128	B1	F251	A1	F416	C1	F613	C3	F917	C2
F129	C2	F252	B2	F419	D3	F614	A3	F918	C2
F130	B2	F253	A1	F420	D1	F615	A3	F919	C2
F131	C2	F254	B2	F450	D1	F616	D3	F920	E1
F132	C2	F255	B2	F451	D3	F617	C3	F921	F2
F133	B1	F256	B2	F452	E3	F618	A3	F922	F2
F134	C2	F257	B2	F453	D1	F619	A3	F923	F3
F135	B1	F258	B1	F454	D1	F620	C3	F924	F2
F136	C2	F259	A3	F455	E2	F621	C3	F925	F3
F137	B1	F260	A2	F456	D1	F622	A3	F926	F3
F138	C1	F261	B1	F457	E1	F623	A3	F927	F2
F139	B2	F262	A2	F458	D1	F624	C3	F928	E1
F140	C2	F263	B1	F459	F2	F625	C3	F929	F2
F141	C1	F264	B1	F460	D1	F626	A3		
F142	B1	F265	B1	F461	D1	F627	D3		
F143	C2	F266	B2	F462	D2	F628	B3		
F144	C1	F267	B2	F463	D2	F629	B3		
F145	B2	F268	B2	F464	D1	F630	C3		
F146	B2	F269	B2	F465	E3	F631	A3		
F147	C1	F270	C1	F466	F3	F632	F2		
F148	C2	F271	B2	F467	E2	F633	C3		
F149	C1	F272	C1	F468	D1	F634	A3		
F150	C1	F273	B1	F469	D1	F635	A3		
F151	B1	F274	B1	F470	D1	F636	A3		
F152	B1	F275	B2	F471	D1	F637	C3		
F153	C1	F276	B2	F501	C3	F638	C3		
F154	C1	F277	B2	F502	C2	F639	B3		
F155	B1	F278	B1	F503	E1	F640	C3		
F156	B1	F279	B2	F504	C2	F641	C3		

Layout Mono board: (Part 1 Test points)

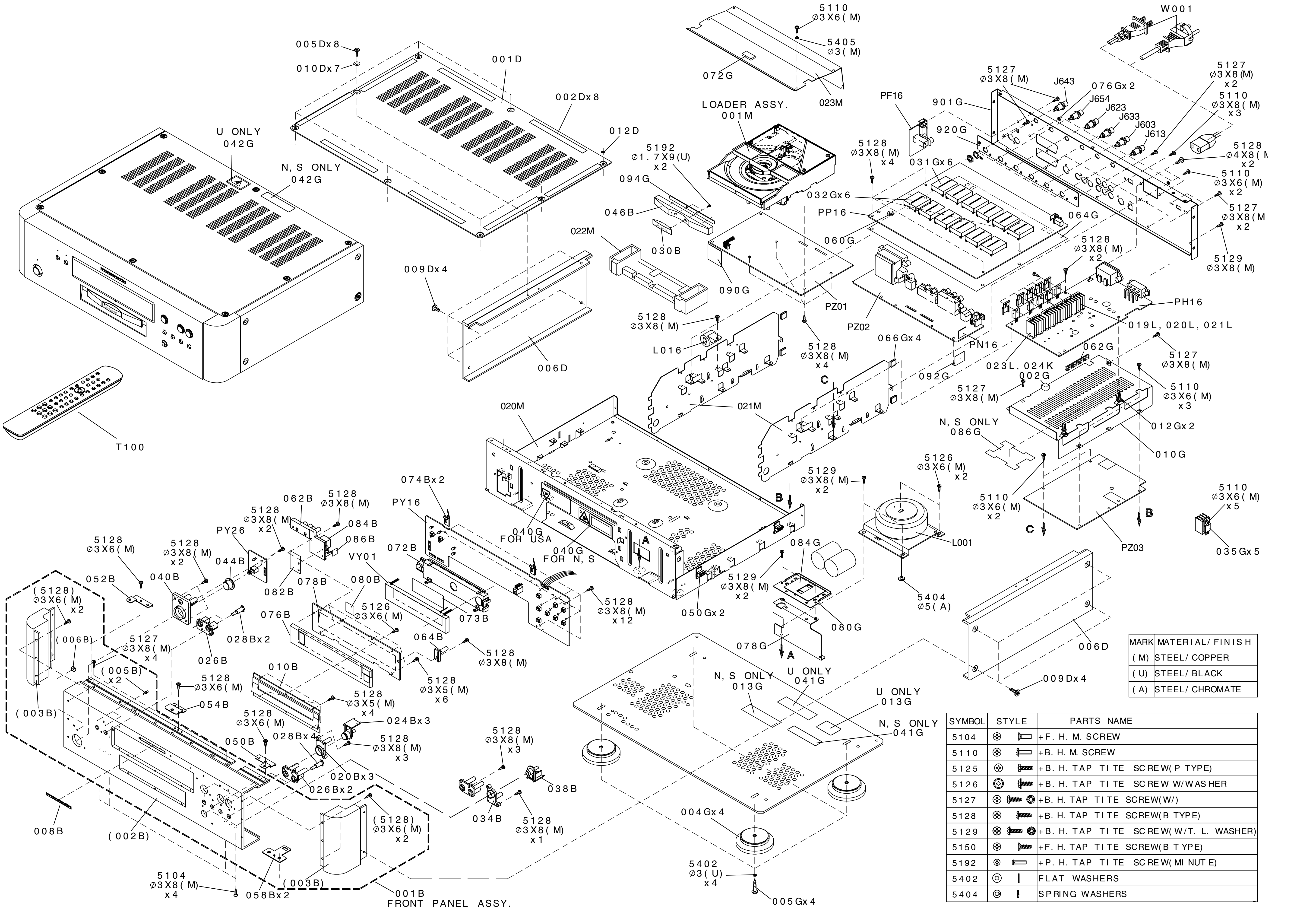


Layout Mono board: (Part 2 Test points)



CL 06532152_087b.eps
141200

8. Exploded view and Parts list



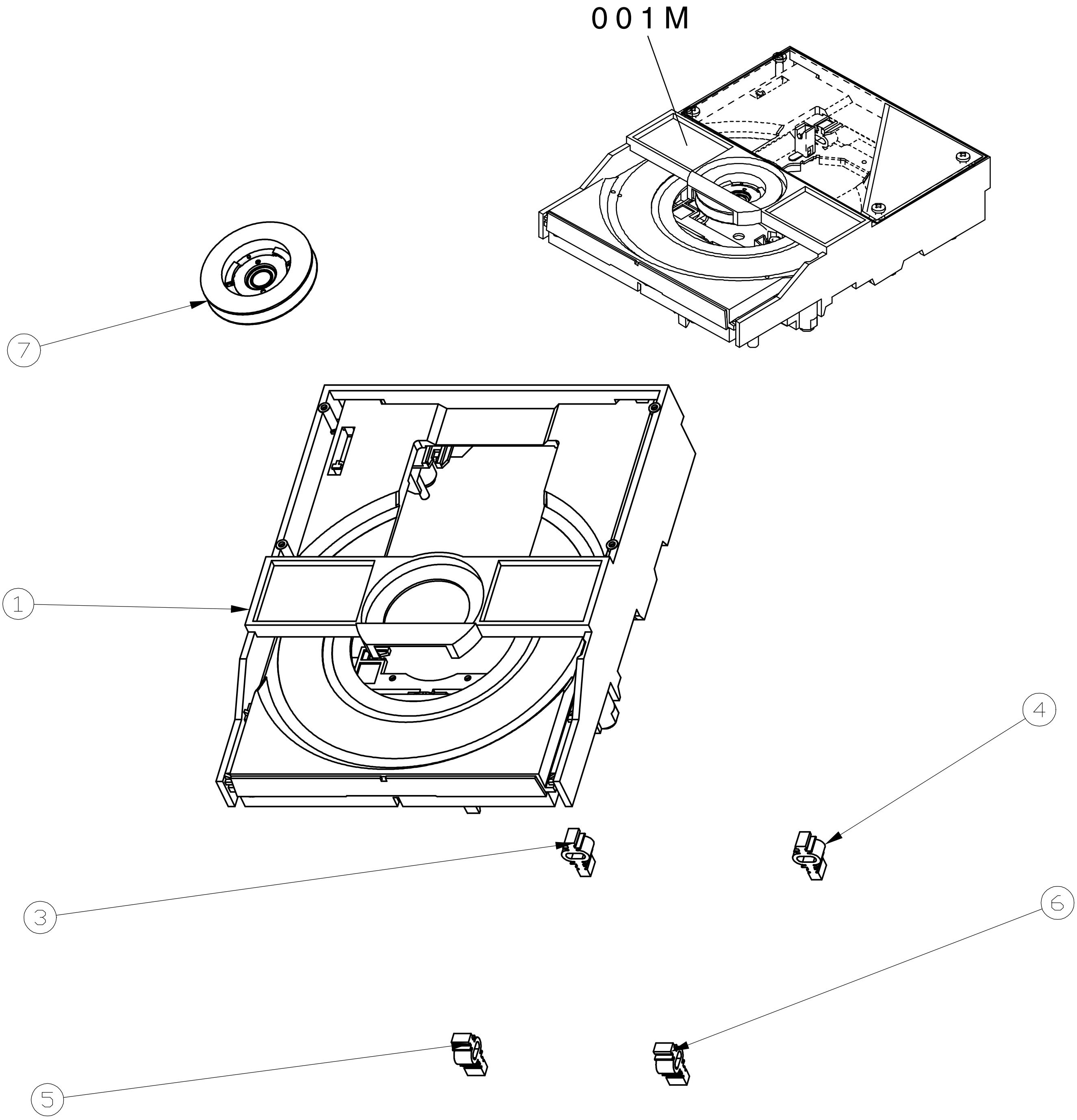
MARK	MATERIAL/FINISH
(M)	STEEL/COPPER
(U)	STEEL/BLACK
(A)	STEEL/CHROMATE

SYMBOL	STYLE	PARTS NAME
5104		+F.H.M. SCREW
5110		+B.H.M. SCREW
5125		+B.H. TAP TITE SCREW(P TYPE)
5126		+B.H. TAP TITE SCREW W/WASHER
5127		+B.H. TAP TITE SCREW(W/)
5128		+B.H. TAP TITE SCREW(B TYPE)
5129		+B.H. TAP TITE SCREW(W/T.L. WASHER)
5150		+F.H. TAP TITE SCREW(B TYPE)
5192		+P.H. TAP TITE SCREW(MINUTE)
5402		FLAT WASHERS
5404		SPRING WASHERS

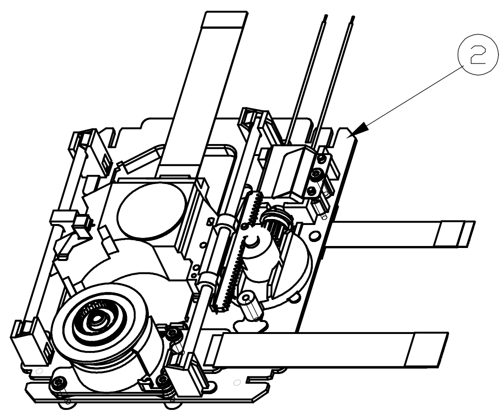
POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
002B	F		FRONT PANEL GOLD HAIR	413K248120
002B	N, S	9965 000 10828	FRONT PANEL GOLD BLAST	413K248110
002B	U		FRONT PANEL BLACK BLAST	413K248010
003B	GOLD	9965 000 10825	ESCUTCHEON SIDE CORNER GOLD	413K063110
003B	BLACK		ESCUTCHEON SIDE CORNER BLACK	413K063010
005B		4822 381 11893	LENS FOR LED	269J355010
006B		9965 000 10823	LENS FOR STANDBY	230K355010
008B	GOLD	9965 000 01554	MARANTZ BADGE GOLD	313J251110
008B	BLACK	9965 000 01553	MARANTZ BADGE BLACK	313J251010
010B	GOLD	9965 000 10829	FRONT PANEL SUB PANEL AL GL	413K248130
010B	BLACK		FRONT PANEL SUB PANEL AL BL	413K248030
020B	GOLD	9965 000 10832	BUSHING PLAY BUTTON GL	413K259110
020B	BLACK		BUSHING BUTTON BL	413K259010
024B	GOLD	9965 000 10835	BUTTON PLAY GL	413K270110
024B	BLACK		BUTTON PLAY BL	413K270010
026B	GOLD		BUSHING NEXT/PREV. BUTTON GL	413K259130
026B	BLACK		BUSHING NEXT/PREV. BUTTON BL	413K259030
028B	GOLD	9965 000 10837	BUTTON NEXT/PREV.GL	413K270130
028B	BLACK		BUTTON NEXT/PREV.BL	413K270030
030B		9965 000 06862	ESCUTCHEON (SACD LOGO)	392K063160
034B	GOLD	9965 000 10833	BUSHING OPEN/CLOSE BUTTON GL	413K259120
034B	BLACK		BUSHING OPEN/CLOSE BUTTON BL	413K259020
038B	GOLD	9965 000 10836	BUTTON OPEN/CLOSE GL	413K270120
038B	BLACK		BUTTON OPEN/CLOSE BL	413K270020
040B	GOLD	9965 000 10834	BUSHING POWER GL	413K259140
040B	BLACK		BUSHING POWER BL	413K259040
044B	GOLD	4822 410 11276	BUTTON POWER GL	176J270150
044B	BLACK	4822 410 11275	BUTTON POWER BL	176J270050
046B	GOLD	9965 000 10826	TRAY ESCUTCHEON GL	413K063120
046B	BLACK		TRAY ESCUTCHEON BL	413K063020
076B	GOLD	9965 000 10827	WINDOW FOR GL	413K158110
076B	BLACK		WINDOW FOR BL	413K158010
001D	GOLD	9965 000 10831	TOP LID GOLD	413K257110
001D	BLACK		TOP LID BLACK	413K257010
005D	GOLD	4822 502 14462	SCR.THINHEAD 3X5NI	318K010020
005D	BLACK	4822 502 14461	SCR.THINHEAD 3X4BL	318K010030
006D	GOLD	9965 000 10830	SIDE PANEL GOLD	413K249110
006D	BLACK		SIDE PANEL BLACK	413K249010
009D	GOLD	4822 502 14425	SCR.THINHED 3X8NI	323S010020
009D	BLACK	4822 502 21693	SCR.THINHED 3X7BL	323S010030
010D			INSULATOR FOR TOP LID	256J120010
004G		4822 462 11116	LEG GOLD BLAST	163J057410
005G		9965 000 10824	SCREW FOR LEG	413K010010
001M		9305 023 61104	VAL6011/04 LOADER COMPLETE	QE02361104
022M		3104 126 25210	DUST CAP	QW12625210
J603		9965 000 10849	TERMINAL EW-2560T-LH-W L-CH	YT02011290
J613		9965 000 10848	TERMINAL EW-2560T-LH-R R-CH	YT02011280
J623		9965 000 10849	TERMINAL EW-2560T-LH-W LS-CH	YT02011290
J633		9965 000 10848	TERMINAL EW-2560T-LH-R RS-CH	YT02011280
J643		9965 000 10850	TERMINAL EW-2560T-LH-B C-CH	YT02011300
J653		9965 000 10850	TERMINAL EW-2560T-LH-B LEE-CH	YT02011300

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
⚠ L001	F		MAINS TRANSF. 100V 50/60Hz	TS58001020
⚠ L001	N, S, U	3104 128 70230	MAINS TRANSF. 115/230V	TS58001010
L011		9965 000 10839	FERRITE CORE TRCN-16-8-13 FOR JH05-SPSU	FC50160040
L012		9965 000 10840	FERRITE CORE USB-4 FOR L001PRI.	FC50270040
L013		4822 526 10691	FERRITE CORE TFCK-16-8-13 FOR L001 SEC.	FC50160030
L014		4822 526 10691	FERRITE CORE TFCK-1608013 CN202 MONO	FC50160030
L015		9965 000 06824	FERRITE CORE HF70SH28X2X10 FOR FFC	FC90280010
L016		4822 526 10691	FERRITE CORE TFCK16-8-13 FOR WY04	FC50160030
⚠ PZ03		3104 129 22150	POWER SUPPLY UNIT	QW12922150
⚠ 0025		8204 056 06810	FUSE 2A GMD-2 FOR POWER SUPPLY UNIT	QC05606810
			PACKING	
001T	F		USER GUIDE	413K851110
001T	N	9965 000 10838	USER GUIDE	413K851310
001T	S		USER GUIDE	413K851350
001T	U		USER GUIDE	413K851250
T100		9965 000 10851	REMOTE CONTROLLER RC-12S1SA	ZK413K0010
⚠ W001	F	4822 321 11337	MAINS CORD MITY DC-302-J 125V 12A	ZC01802080
⚠ W001	N	4822 321 11033	MAINS CORD 2P 10A 250V CLASS2	ZC01803080
⚠ W001	S		MAINS CORD 250V 10A FOR UK	ZC01804100
⚠ W001	U		MAINS CORD 10A 125V UL/CSA	ZC01803100
			NOT STANDARD SPEAR PARTS	
001S			PACKING CASE	413K801010
002S			CUSHION	413K809010
008S			ACCESSORY BOX	413K801210

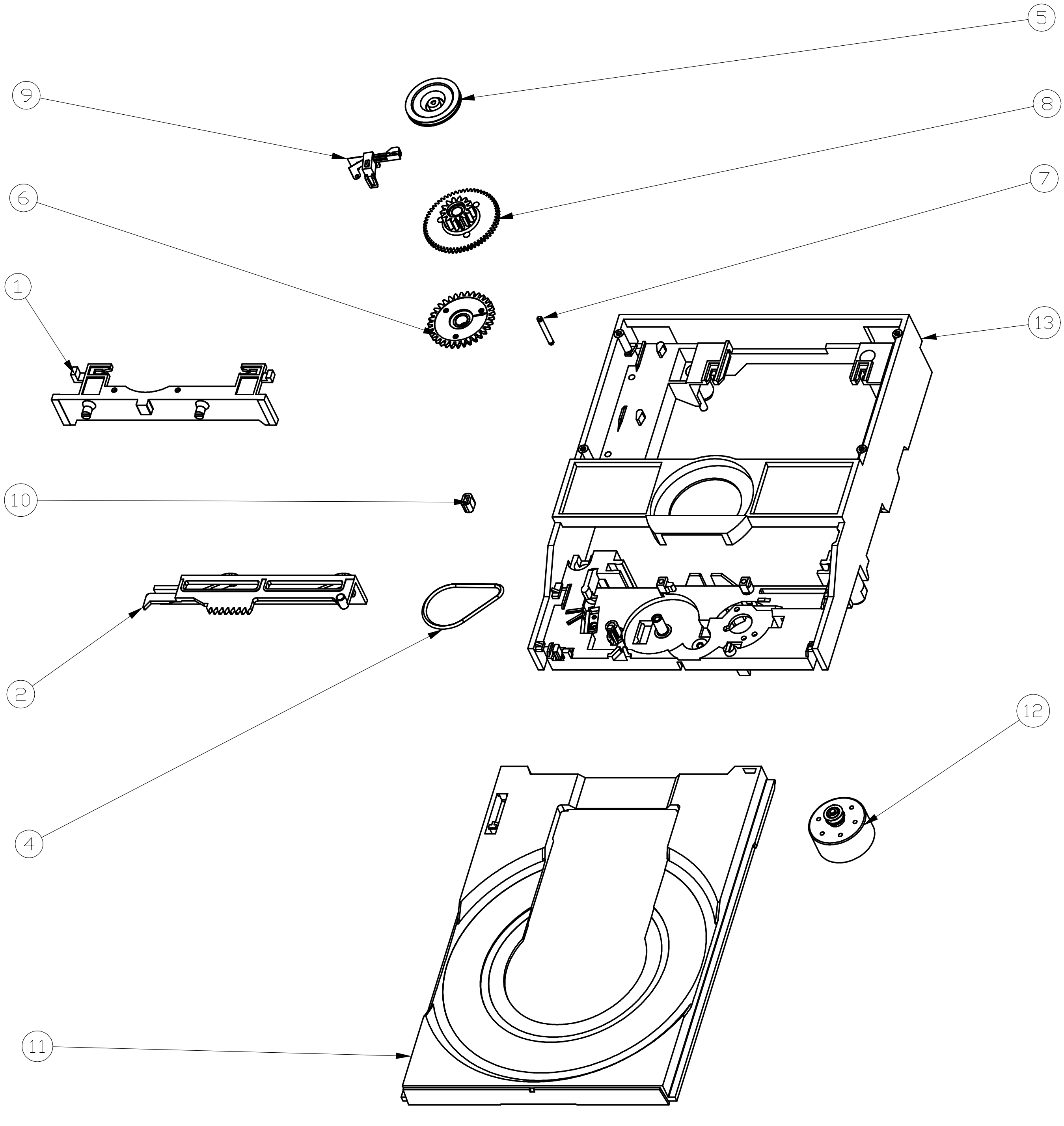
NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.



POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
001M		9305 023 61104	VAL6011/04 LOADER COMPLETE	QE02361104
1		nsp	MECH. UNIT, GENEVA LP LOADER ASSY	nsp
2		nsp	VAM6001/01	nsp
3		3139 194 00710	SUSPENSION (YELLOW)	QT19400710
4		3139 194 00710	SUSPENSION (YELLOW)	QT19400710
5		3139 194 00620	SUSPENSION (BLUE)	QT19400620
6		3139 194 00620	SUSPENSION (BLUE)	QT19400620
7		3139 197 60060	CLAMPER ASSY	QT19760060



NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.



POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
4		4822 358 10266	BELT, DRIVING	QP35810266
9		3139 198 80010	SWITCH, OTHERS	QT19880010
10		4822 532 13097	RING, RUBBER	QP53213097
11		3139 194 00270	TRAY, PLASTIC	QT19400270
12		3139 197 50060	MOTOR ASSY DC <=37.5W	QT19750060

NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

9. Circuit-, IC descriptions and list of abbreviations

9.1 SAA7399 (MACE2) General.

Mace2 is a name used for the successor of the ACE1 IC. The term MACE (mini-ACE) is used because MACE2 does not have a decoder on board. Application area's: Mainly CD-R(W) and prototyping of DVD(-ROM) or high speed CD-ROM.
Functions implemented on-board of MACE2:
A further improved digital servo module. Derived from the ACE1 servo module, but with improvements (make the input switchable between diode signal and error signal processing, improved brake).
The 80C51 micro-controller with external ROM.
The OPC. Optimum Power calibration, used for CDR.
The PCS. Position Control Sledge. A way to speed up sledge movement using hall sensors.

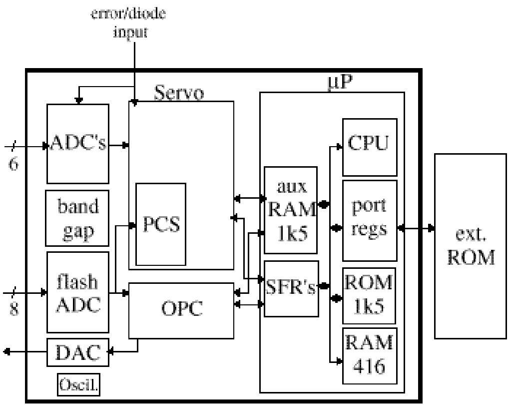


Figure 9-1 Overall block diagram MACE2.

9.2 Features

- Focus and Radial servo loop.
- Built-in access procedure.
- Selectable servo error or servo diode inputs.
- Focus noise performance equivalent to DSICS
- Automatic closed loop gain control available for focus and radial loops
- High speed track crossing velocity measurement > 350 kHz.
- Fast Radial Brake circuitry.
- Sledge motor servo loop, with pulsed sledge support and PCS
- Incorporated micro-controller equivalent to 80C51 --> 66MHz.
- Programmable wait state controller.
- Two embedded RAM's of 416 bytes and 1.5 kB res.
- Optimum Power Calibration Hardware support up to write at N=8.
- Debug facilities.
- Memory mapped interface to sub-modules.
- Programmable clock multiplier.
- 8 Multipurpose I/O lines.
- 5 external interrupt lines.
- External Flash ROM support.
- Sledge stepper motor support.

9.3 The Digital Servo block.

In a CD system, there are some 12 control loops active. About six of them are needed to adjust the servo error signals, that is once per disc rotation offsets, signal amplitudes and loop gains (AGC's) are adjusted to enlarge system robustness and to avoid expensive potentiometer adjustments in production. The other six loops determine the laser spot position on the disc in the radial, axial (focus) and tangential directions. The servo in MACE2 takes care of these controls.
The servo inside Mace2 also has to take care that the spot accesses a required position as fast as possible. This access system consists of two parts, namely the actuator and the sled, which are within a certain range, mechanically and electrically independent. So during an access the servo has to control as well the actuator as the sled.

9.4 Functional description servo

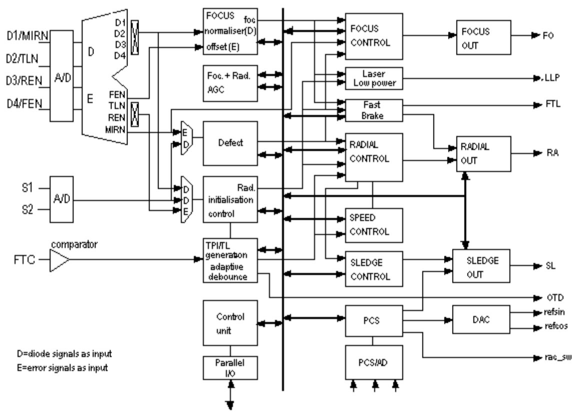


Figure 9-2 Mace2 servo block diagram.

The following functions can be distinguished:
- A to D conversion: a direct AD-conversion of the diode/error currents.
- Pulse density D to A conversion: Noise shaper output stages.
- Control unit: Provides mainly the communication and on/off functions.
- Focus normaliser: A partial division of focus and sum signal. Special saturating provisions are included when dividing through very small numbers.
- Initialisation control: Includes the radial normaliser, automatic radial offset compensation and level initialisation for the Track Position Indicator (TPI) for both diode and error input signals.
- TPI/TL generation and adaptive debounce: Generates Track loss (TL) which is protected against disc defects. The TL is made out of the unprotected TPI signal. The debouncer (with improved debounce times) minimises the disturbing effect of HF on the TL and Rp crossovers for the track count circuitry.

- Defect detector: Holds the focus and/or radial control signal on disc dropouts.
- Speed control: Used during access. With radial actuator feed forward.
- Focus control: PID controller with wide range adjustable characteristics.
- Radial control: PID controller with wide range adjustable characteristics.
- Sledge control: PID controller with wide range adjustable characteristics and a pulsed sledge controller.
- Laser Low Power: Switches the laser from write back to read power whenever the device tends to go off-track.

9.5 Input circuits servo

Five out of six of the MACE2 servo inputs can be switched between diode current inputs (for audio and data application) and error signal inputs (for recordable applications).
The analogue signals from the diode pre processor are converted into a digital representation using A/D converters.

9.6 Focus control.

9.6.1 Focus start-up.

To bring the actuator in focus position a triangular shaped voltage is applied to the actuator to perform a search movement. When the lens moves from or to the disc, CA (central aperture) is monitored to reach a certain programmable absolute level. When this value is CA level is reached, the FOK signal becomes true and FEn is passed to the FEn level detector.
At the moment this FEn level is reached the wait for the focus mode is entered and the focus control loop is enabled to detect a sign inversion in the FEn signal.
When this zero crossing in this FEn signal is detected, the loop is closed to function as PID controlled loop and is switched to the PID mode.
During focus start-up a dither signal is added to the output signal of the integrator. It prevents the actuator from hitting its natural resonance. With this technique quantisation, effects are compensated for during start-up.

9.6.2 Focus Position Control loop.

The focus control loop contains a digital PID controller that has 5 parameters available to the user. These coefficients influence the integrating, proportional and differential action of this PID and a digital low pass filter following the PID. The fifth coefficient influences the loop gain.

9.6.3 Dropout detection.

This detector can be influenced by one parameter. The FOK signal will become false and the integrator of the PID will hold if the CA signal drops below this programmable absolute CA level. When the FOK signal becomes false, it is assumed as caused by a black dot in the first place.

9.6.4 Focus Loss detection and Fast restart.

Whenever FOK is false longer than about 2 ms, it is assumed that the focus point is lost. A fast restart procedure is initiated which is capable of restarting the focus loop within 200 to 300 ms depending on the uP-programmed coefficients.

9.6.5 Focus Automatic Gain Control loop.

The loop gain of the focus control loop can be corrected automatically to eliminate tolerances in the focus loop. This gain control injects a signal into the loop that is used to correct the loop gain. Since this decreases the optimal performance, the gain control should only activated shortly (for instance when starting a new disc).

9.7 Radial control.

The MACE2 digital controller includes the following radial servo functions:

9.7.1 Level initialisation:

During start-up an automatic adjustment procedure is activated to set the values of the radial error gain, offset and satellite sum/MIRN signal gain for TPI level generation. The initialisation procedure runs in a radial open loop situation and is < 200 ms. This start-up time period may coincide with the last part of the turntable motor start-up time period.

9.7.2 Automatic gain adjustment:

Because of this initialisation the amplitude of the RE signal is adjusted within _10% around the nominal RE amplitude.
Offset adjustment: The additional offset in RE due to the limited accuracy of the start-up procedure is less than +/- 50nm.

9.7.3 TPI level generation:

The accuracy of the initialisation procedure is such that the duty cycle range of TPI becomes 0.4 < duty cycle < 0.6.

Sledge home:
Sledge moves to reference position at the inner side of the disc with user defined voltage.

Tracking control:
The actuator is controlled using a PID loop filter with user defined coefficients.

Access:
In Mace2 there are two fundamentally different ways to perform an access:

Using the PCS
A more detailed description of this access method is given in an other section.

Using the servo controlled access:
The way it was done in the predecessors of Mace2.This access procedure is divided into 3 different modes, depending on the requested jump size:
access type size access speed
Actuator jump decreasing velocity
Sledge jump maximum power to sledge 1
Controlled sl. jump controlled brake power
The access procedure makes use of a track counting mechanism, a velocity signal based upon the number of tracks passed within a fixed time interval, a velocity setpoint calculated from the number of tracks to go and a user programmable parameter indicating the maximum sledge performance.
If the number of tracks to jump is too large, then the Sledge jump mode is activated, else the actuator jump is performed. The requested jump size together with the required sledge braking distance at maximum access speed defines the value of the maximum numbers of tracks.
During the actuator jump mode, velocity control with a PI controller is used for the actuator. The sledge is then continuously controlled using the filtered value of the integrator contents of the actuator. All filter parameters (for actuator and sledge) are user programmable.

In the sledge jump mode maximum power (user programmable) is applied to the sledge in the correct direction, while the actuator becomes idle.

Radial Automatic Gain Control loop:
The loop gain of the radial control loop can be corrected automatically to eliminate tolerances in the radial loop. This gain control injects a signal into the loop which is used to correct the loop gain. Since this decreases the optimal performance the gain control should only be activated shortly (for instance when starting a new disc). This gain control differs from the earlier mentioned level initialisation. This level initialisation should be done first. The level initialisation without the gain control reduces tolerances from the front-end only.

9.8 The radial PID.

Since we are dealing with a big variety of applications and drives, the servo controllers in MACE2 should be adjustable within a large frequency range.
In order to read out the track properly -a track consists of sequential ordered data pit's which hold audio, video or ROM data - the focus and radial position controls must follow the moving track within some tenths of a micrometer, despite of disc imperfections and external disturbances.
For instance, a rotating disc causes, due to track eccentricity, track unroundness, or disc skew, track movements up to some millimetres. The control loop reduces this to about one tenth of a micrometer.

9.9 Initialisation control.

Due to optical, electrical and mechanical tolerances in CD players, properties of the servo signals such as offset and gain can vary. In general, without proper signal processing, a simple PID controller function cannot cope with this relatively large offset and gain spreads. Therefore, gain and offset adjustments during manufacture or active control, to compensate for these signal imperfections, become inevitable.
Adjustment procedures in the factory are expensive. So, automatic adjustment procedures have been implemented in order to avoid most of the potentiometer adjustments. In the MACE2 servo automatic adjustments are applied to the radial error signal only.

9.10 The AGC.

The Automatic Gain Control is used in the MACE2 digital servo to adjust the radial and focus bandwidths to a nominal value. Injecting a signal in the loop and measuring the phase of its resulting signal (wobble method) does this.
Principle of the Automatic Gain Control.
The principle of the Automatic Gain Control (AGC) circuit, as used in MACE2, is drawn in the next figure.

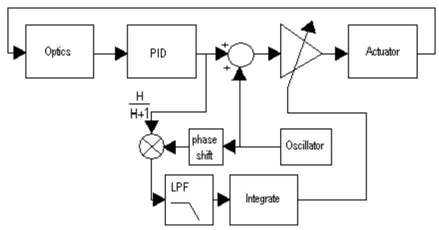


Figure 9-3 Principle of the automatic gain control.

A sine wave signal with a certain frequency is injected in the control loop at the summation point. The resulting signal is measured before the injection point. The injected signal is shaped by H/1+H . This measured signal is multiplied by a phase shifted version of the injected signal. The result of the multiplication is low pass filtered and integrated. (The integrator is started at the nominal gain of the control loop). The result of the integration is fed to the adjustable loop gain. This principle, synchronous detection, is also known as 'wobble method'.

9.11 The Fast brake.

The fast brake is an aid to speed up radial capture after a high-speed jump. It is a separate radial control with a much higher bandwidth. The radial control output can be switched between fast brake mode and original radial control mode. The fast brake helps the radial actuator at the end of a jump to "stick" to the right track. In fast brake mode, the actuator starts to follow the track movements. It's a bit like jumping on a moving train. If you run as fast as the train, you can just step in. After a radial open loop jump the tracks are moving (as a result of eccentricity) at a very high speed underneath the radial actuator. This speed is too high for a normal radial control loop to do radial capture. When the radial control is switched over to fast brake mode for a short term, this moving of the tracks underneath the actuator becomes much slower, (because the actuator follows the track movement), so when you switch back to original radial control, it's much easier to do radial capture.

9.12 The Defect Detector.

Because of the possible earlier mentioned defects (fingerprints, etc) a defect detection circuit is incorporated into the MACE2 servo. If a defect is detected, the radial and focus error signals may be zeroed, resulting in better playability.

9.12.1 Operation:

The defect detector prevents the light spot from going out of focus and going off track due to disc dropout excitations. The defect detector can be switched on and off under software control and can be applied to the focus control only, or both to the focus and radial control.
Whenever this circuit detects a defect, it will hold all radial and focus controls.
The hold signal is generated whenever the reflected light intensity drops rapidly (< 1:5 ms) down to roughly 75% of the actual intensity level. In that case the output of the comparator becomes active and controls the focus and radial signal switch.
This circuit improves the playability of the application (black dot performance, etc) and is programmable to optimise it for specific disc defects. The actions of this circuit can be monitored on the DEFO pin (active high).
An external defect detection circuit can be added by removing the connection between DEFO and DEFI (normal operation) and inserting the external circuitry.
These signals are afflicted with some uncertainties caused by:

- Disc defects like scratches and fingerprints
- The HF information on the disc, which is considered as noise by the detector signals.

9.13 Laser Drive On.

The LDON pin is used to switch the laser drive off and on. It is an open drain output. In case the laser is on, the output has a high impedance. The pin will be automatically driven if the focus control loop is switched on.

9.14 Laser Low Power (LLP).

The LLP output can be used by write-able systems to switch the laser back to read power when the light spot goes off-track while writing discs. To prevent that the neighbour tracks are damaged when the spot goes off-track the laser has to be switched very fast to the safe read power. The laser is not switched off (like LDON does), so the system can carry on reading.
The tracking (radial) and focus error signals are used to disable the laser write power. This is done through the LLPn, active low Laser Low Power, signal. Note that LLPn is a servo output, which is inverted before it is output via the LLP pin, so the LLP pin is active high.
So, if any of the following conditions is true, the laser write power is disabled by the MACE2 servo.

– Off Track, more than a quarter off a track away from the correct one
– ORD, radial error signal too large. Larger than the given setpoint, which should be chosen at a critical write failure level. An adjustable band pass filter first processes the radial error signal.
– OFD, focus error signal too large. Larger than the given setpoint, which should also be chosen with care. An adjustable band pass filter also first processes the focus error signal. All settings of the focus and radial part are independent.
– OTR, prot stat flag which becomes active if ORD becomes active during an actual laser write (LWR) action. This flag is reset only by a status read (RSTAT) command. So until then LLPN stays active.
– OFO, prot stat flag that becomes active if OFD becomes active during an actual laser write action. Same idea as OTR.

This error detection circuit can be switched off (apart from the Off Track detection) by raising the setpoint levels to its maximum value.

9.15 The OPC.

The OPC block in Mace2 is used for the following functions:

During write actions, it stores Pw samples, which can be evaluated by the microprocessor.
During OPC read actions, it stores A1, A2 and CALF samples, which are used for calculating the asymmetry and the modulation index.
The OPC block is used for EFM detection.
During reading of a disc, it stores A1 and CALF samples, which can be monitored.

Although the OPC block is used for multiple functions, it got it's name from the OPC procedure, which is it's main task.
The OPC (Optimum Power Calibration) procedure is used in CD-R/CD-RW/DVD-RAM applications. It is used to "calibrate" the laser write power in writable systems.
It reads in 3 analogue signals from an analogue pre-processor like AEGER-2 (A1, A2, and CALF) and the actual write power (Pw) from the laser controller and feeds an analogue output signal Alpha0 back to AEGER-2. A1, A2 and CALF represent the max, min and average value of the EFM signal respectively. Alpha0 controls the laser write power. All analogue signals are converted to an 8 bit digital signal. Conversion frequency at 16.9MHz base clock is 88kHz (each channel).

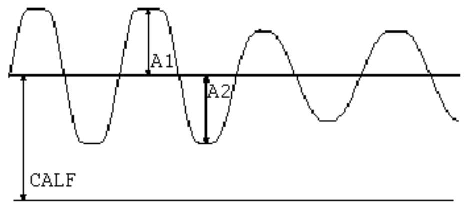


Figure 9-4 Definition of the A1, A2 and CALF signals.

9.16 Definition of terms.

The asymmetry (and modulation index m of the EFM signal are calculated from the analogue inputs:

$$\beta = \frac{A1 - A2}{A1 + A2}$$

$$m = \frac{A1 + A2}{A1 + CALF}$$

9.17 Rough description of the OPC procedure

Basically the OPC procedure tries to find out the optimum laser power to be used on a specific disc. The OPC procedure uses about 15 ATIP frames. These frames are located in the "PCA" area. This is a special part of the disc used only for power calibration. The drive first checks whether there are 15 frames "empty" in the PCA. Next the OPC is performed in these 15 frames.
The OPC operation consists of two stages: A "write" and a "read" stage. First 15 ATIP frames are written (during which the OPC block stores Pw samples), and then the same 15 ATIP frames are read back again, (during which the OPC block stores A1, A2 and CALF samples). During the write stage, random EFMis written in a test area located on the inner side of the disc. During this recording the write power is increased stepwise from a low to a high power level.

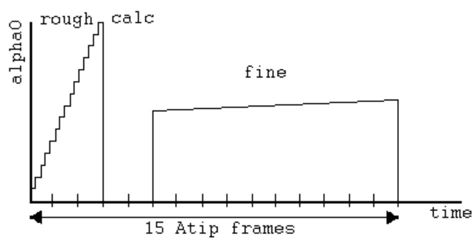


Figure 9-5 Figure 5: OPC write profile.

First during 3 ATIP frames the power is increased in rather big steps (rough OPC). During this action Pw samples are stored into memory. During the rough OPC, the OPC makes 7 steps per ATIP frame. This gives 21 samples into the OPC memory. From these samples, the microprocessor can calculate what's roughly the best alpha0 setting for this typical disc.
After 2 frames of calculations, another 10 ATIP frames are written using smaller steps (fine OPC) around the alpha0 setting, which gave the best result during the rough OPC.
The second stage of the OPC procedure is the "read" phase

in which the pattern recorded in the previous stage is read back.
During this read phase the OPC block stores A1, A2 and CALF samples from exact the same location where during the OPC write phase the Pw samples where stored. The samples for A1, A2, CALF and Pw are listed side by side into memory. After the read back phase the processor calculates at which setting of alpha0 the least jitter is encountered. This setting will be used to write the disc with.

9.18 The OPC top level.

The OPC block as a whole has 5 possible modes:
– Recording mode: This can be either OPC writing (writing EFM test patterns to disc and Alpha0 stepping) or standard write mode (i.e. alpha0 is constant).
– OPC reading: Reading back OPC test patterns from disc.
– Normal read mode: detects the presence of EFM.
– DVD read mode: used for DVD-RAM experiments.
– EFMD only mode: no data being written to the AUX RAM, but the EFM detector and the PW monitor still running. Contents of the QUX RAM remain unchanged.

All actions in the OPC hardware are synchronised to the ATIP frame sync, which can be either generated internally or received from the encoder/decoder during writing. The microprocessor writes data asynchronously to the OPC hardware. The OPC block synchronises this data to the sync either internally generated, or obtained from CDR60.

9.19 The Analogue to Digital converter.

The analogue to digital converter of the OPC is shared with the ADC required by the PCS.

9.20 The digital input filters.

The combined ADC for the OPC and the PCS delivers a multiplexed stream of 8 bit words. A sequential low-pass filter filters this multiplexed stream. The 4 analogue multiplexed input signals from the OPC (A1, A2, CALF and Pw) are filtered by 4 identical LPF's. (One for each channel). This filters can be adapted to various speeds by changing the subsampling factor (i.e. the sample rate of the filter), the cut off frequency scales with the sample frequency. The sample frequency of the filter is equivalent to the OPC timebase frequency, which is the output of the pre-scaler.

9.21 OPC demux.

The OPC demux block demultiplexes the stream supplied by the LPF. This same block also changes the format of the digital data from signed (representation inside the filter) to unsigned (representation in the rest of the OPC). The demultiplexing process introduces one baseclock delay.

9.22 The sequencer.

The OPC sequencer controls the timing of all the hardware actions in the OPC hardware. It generates the OPC timebase and locks it to the ATIP pulse. A programmable pre-scaler generates the OPC timebase.
Dividing the ADC sample clock by 8 derives the input clock of this pre-scaler. (= Identical to the sample rate per channel).
The pre-scaler can divide this clock by a number in the range from 1-16. The division factor can be programmed via the OPC ctrl register. The OPC timebase is locked to the selected ATIP source, which can be either an external ATI P sync or an internally generated sync. (Programmable).
The OPC timebase clock supplies the sample frequency for the input LPF's, the OPC pre-processor and the EFM detector.
The sequencer controls the timing of all the hardware actions in the OPC hardware. The sequencer is started either by an external ATIP sync or an internally generated sync (programmable).
All data acquisition and alpha0 settings change synchronised to this sync signal (rising edge of the ATIP sync). An exception on this is the switching of the ATIP input itself, which is immediately changed whenever the bit in the OPC ctrl register is changed. When this was latched on the ATIP source itself, it would create a deadlock when there was no ATIPin from CDR-60.

9.23 The Pw monitor

The Pw monitor is used during the "OPC write" and normal write mode. The comparator compares the incoming Pw with two programmable thresholds PW MAX and PW MIN. Both these thresholds can be programmed via the OPC PW register, which contains 4 bits for each threshold.
Internally both 4-bit thresholds PW MAX and PW MIN are extended to 8 bit values. The compare function performs an unsigned compare.
The first threshold is used to detect fingerprints. The second is used to check the correct operation of the laser driver.

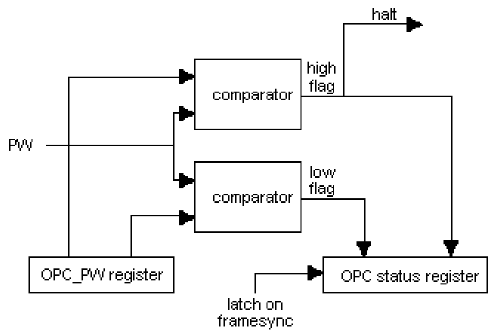


Figure 9-6 OPC PW monitor.

DVDALAS2plus Advanced Analogue DVD Signal Processor and Laser Supply

TZA1033

FEATURES

- Operates with DVD-ROM,DVD-RAM, DVD+RW, DVD-RW, CD-ROM and CD-RW media
- Operates up to 64x CD-ROM and 8x DVD-ROM
- Support for Dual Light pen DVD systems (DVD/CDRW)
- DVD-RAM (C) playback capability
- DVD-RAM Land-Groove servo polarity switching
- 3 different tracking servo strategies:
  Conventional 3 beam tracking for CD
  Differential Phase Detection (DPD) for DVD-ROM (including option to emulate traditional drop out detection; drop out concealment)
  Advanced Push Pull with dynamic offset compensation for DVD-RAM (recorded and unrecorded areas)
- Radial error signal for fast track counting (FTC)
- 2 different strategies to read header data:
  - Full bandwidth Push Pull signal
  - Left and Right side signal
- Universal photo diode IC interface using internal conversion resistors and offset cancelation
- Flexible adaption to different light pen configurations
- Input buffer amplifiers with low-pass filtering
- RF data amplifier with wide (programmable) bandwidth equivalent to 64xCD / 8x DVD when using equaliser function
- Built-in equalisers cover CAV inner-outer disc range at highest speed.
- Programmable RF gain for DVD-ROM / DVD-RAM / CD-RW / CDROM applications(approx 50dB range)
- Balanced RF-Data signal transfer (single ended still supported)
- Fully automatic laser control including stabilization and an ON/OFF switch, plus a separate supplypin for power efficiency
- Automatic monitor diode polarity selection.
- 3 and 5 V compatible digital interface
- Enhanced signal conditioning in DPD circuit for optimal tracking performance under noisy conditions.

GENERAL DESCRIPTION

The DVDALAS2 is an analogue preprocessor and laser supply circuit for DVD / CD read only players. The device contains data amplifiers, several options for radial tracking and focus control. The preamplifier forms a versatile, programmable interface between dual, voltage output CD/DVD mechanisms to Philips' digital signal processor family for CD and DVD (Gecko, HDR65, Iguano, etc..)

The device contains serval options for radial tracking:
Conventional 3 beam tracking for CD;
Differential Phase Detector (DPD) for DVD;
Push Pull for DVD-RAM with flexible L/R weighing to compensate dynamic offsets e.g. beamlanding offset.
A radial error signal is generated to allow fast track count (FTC) during track jumps.

The dynamic range of this preamp/processor combination can be optimized for the LF servo and RF data paths. The gain in both channels can be programmed separately. This will guarantee an optimal playability for all kind of discs.

Several functions are included to allow playback of DVD-RAM(C) discs:

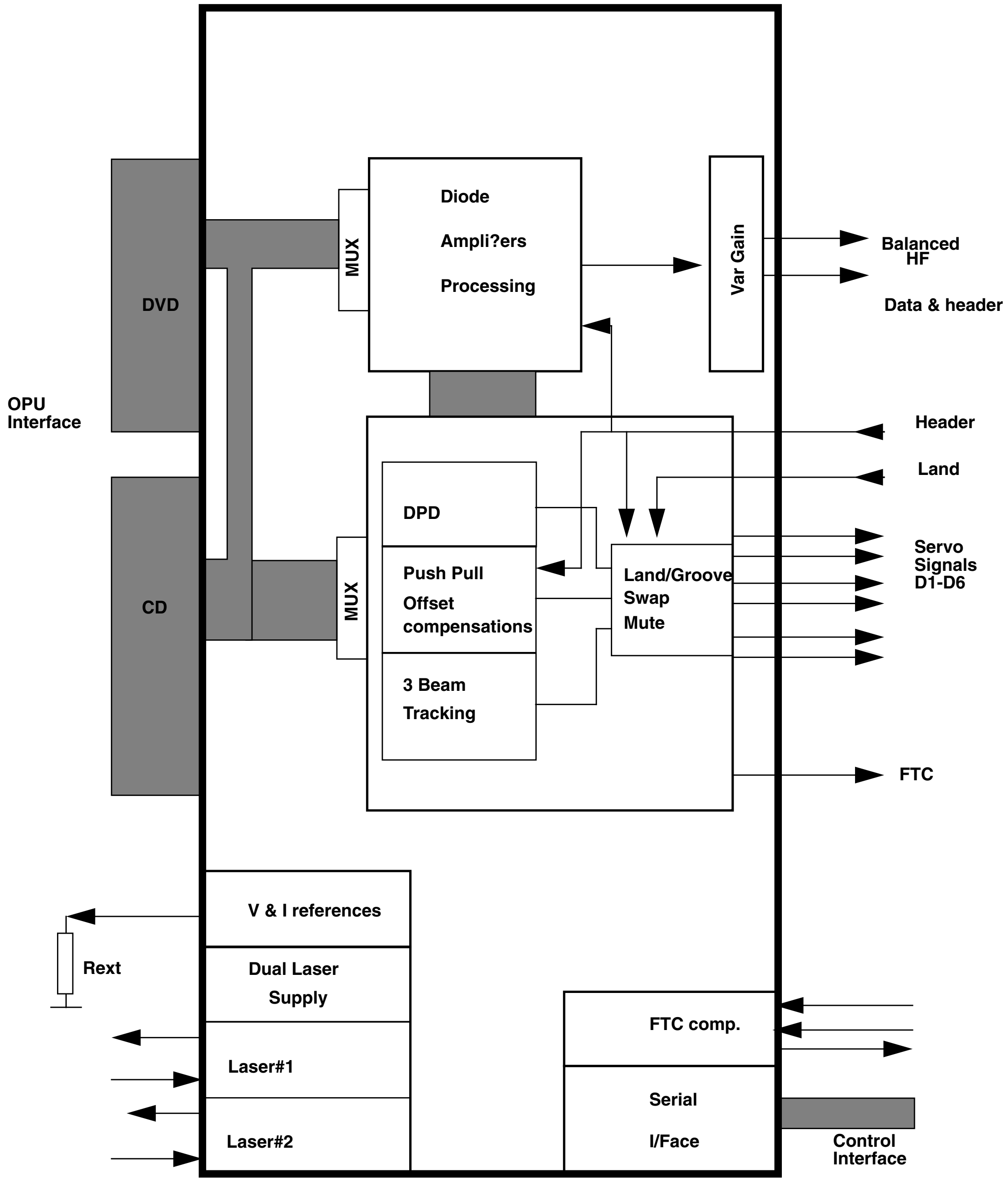
- The header information can be read via the data output path (RF)
- DC offset compensation techniques provide a fast settling after disc errors.
- Radial servo Polarity switch for land/groove
- two settings for focus offset correction for land and groove

The device can accommodate astigmatic, single foucault and double foucault detectors and can be used with P-type lasers with N- or P-sub monitor diodes. After an initial adjustment, the circuit will maintain control over the laser diode current. With an on-chip reference voltage generator, a constant and stabilized output power is ensured independent of ageing. A separate power supply connection allows the internal power dissipation to be reduced by connecting a low voltage supply.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
TZA1023	LQFP64	Plastic low profile QFP64; body 10 x 10 x 1.4 mm	SOT314-2

DEVICE BLOCK DIAGRAM



PINNING

Name	Pin	Description
CD-A	1	CD pick up input A
CD-B	2	CD pick up input B
CD-C	3	CD pick up input C
CD-D	4	CD pick up input D
CD-REF	5	CD pick up reference voltage
CD-E	6	CD pick up input E
CD-F	7	CD pick up input F
DVD-A	12	DVD pick up input A
DVD-B	13	DVD pick up input B
DVD-C	14	DVD pick up input C
DVD-D	15	DVD pick up input D
DVD-ref	16	DVD pick up reference voltage
O-A	48	Servo current output for Focus-A
O-B	47	Servo current output for Focus-B
O-C	46	Servo current output for Focus-C
O-D	45	Servo current output for Focus-D
O-central	40	Testpin for offset cancelation
TD2	37	Internally connected
FTC-ref	36	Servo output voltage reference input
S1	42	Servo current output for radial tracking
S2	41	Servo current output for radial tracking
TD1	35	Internally connected
FTC	33	Fast track count voltage output
RFP	55	pos. RF output signal
RFN	56	neg. RF output signal
RF-REF	54	DC Reference signal input RF
LPF-DPD1	38	DPD Low pass bandwidth capacitor, channel pos
LPF-DPD2	39	DPD Low passbandwidth capacitor, channel neg
Land	20	Land/groove toggle input
HEADER	21	Header detector window input
CD-MI	62	CD laser monitor input
DVD-MI	10	DVD laser monitor input
CD-LO	61	CD laser output
DVD-LO	64	DVD laser output
COP	27	Positive inputFTC comparator
COM	28	Inverting inputFTC comparator
COO	29	FTC comparator output

Name	Pin	Description
SIDA	23	Serial host interface data input
SICL	24	Serial host interface clock input
SILD	25	Serial host interface load
VDDA1	8	Analog Supply voltage 1 (RF input)
VDDA2	59	Analog Supply voltage 2 (RF internal)
VDDA3	53	Analog Supply voltage 3 (RF output stage)
VDDA4	44	Analog Supply voltage 4 (Servo)
VDDD5	30	Digital Supply voltage (5V dig core)
VDDD3	22	Digital Supply voltage (3V I/O pads and FTC comp.)
VDDL	63	Supply voltage for laser
VSSA1	9	Analog Ground 1
VSSA2	58	Analog Ground 2
VSSA3	57	Analog Ground 3
VSSA4	43	Analog Ground 4
VSSD	26	Digital ground
Rext	60	Reference current input (Connect 12k1 to VSSA4)
STB	31	Standby input
TM	19	Testmode input
TDO	34	test data out

PINNING

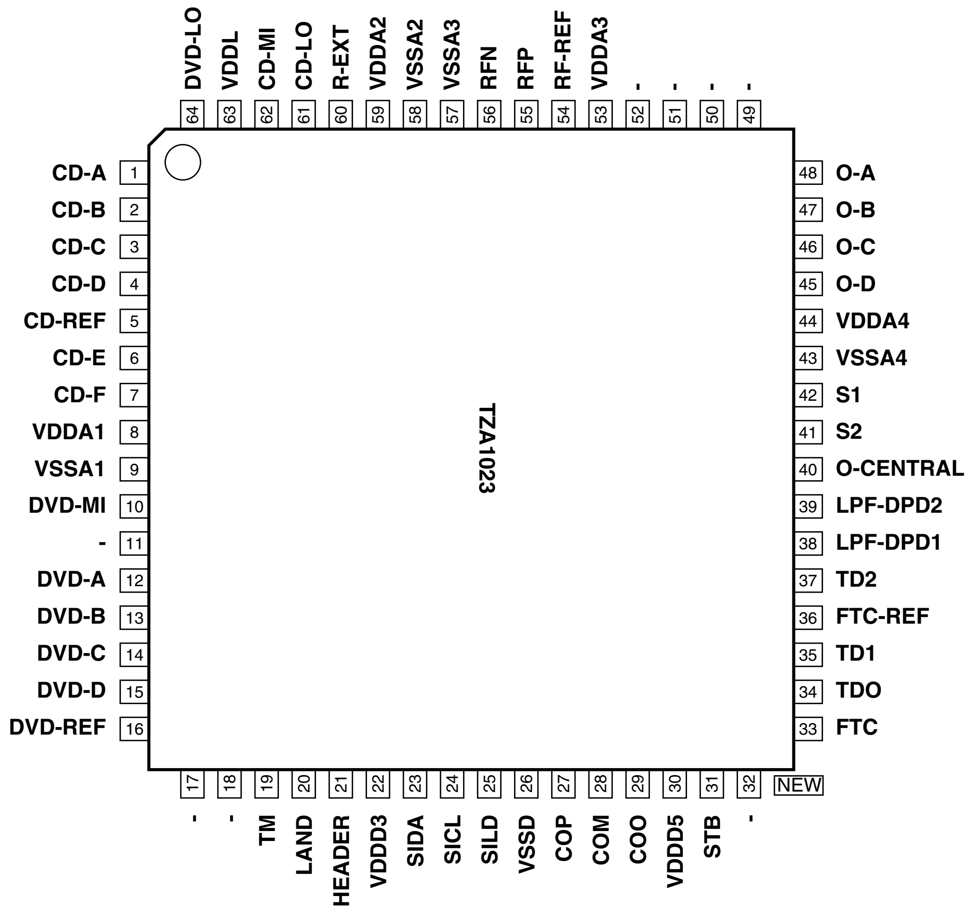


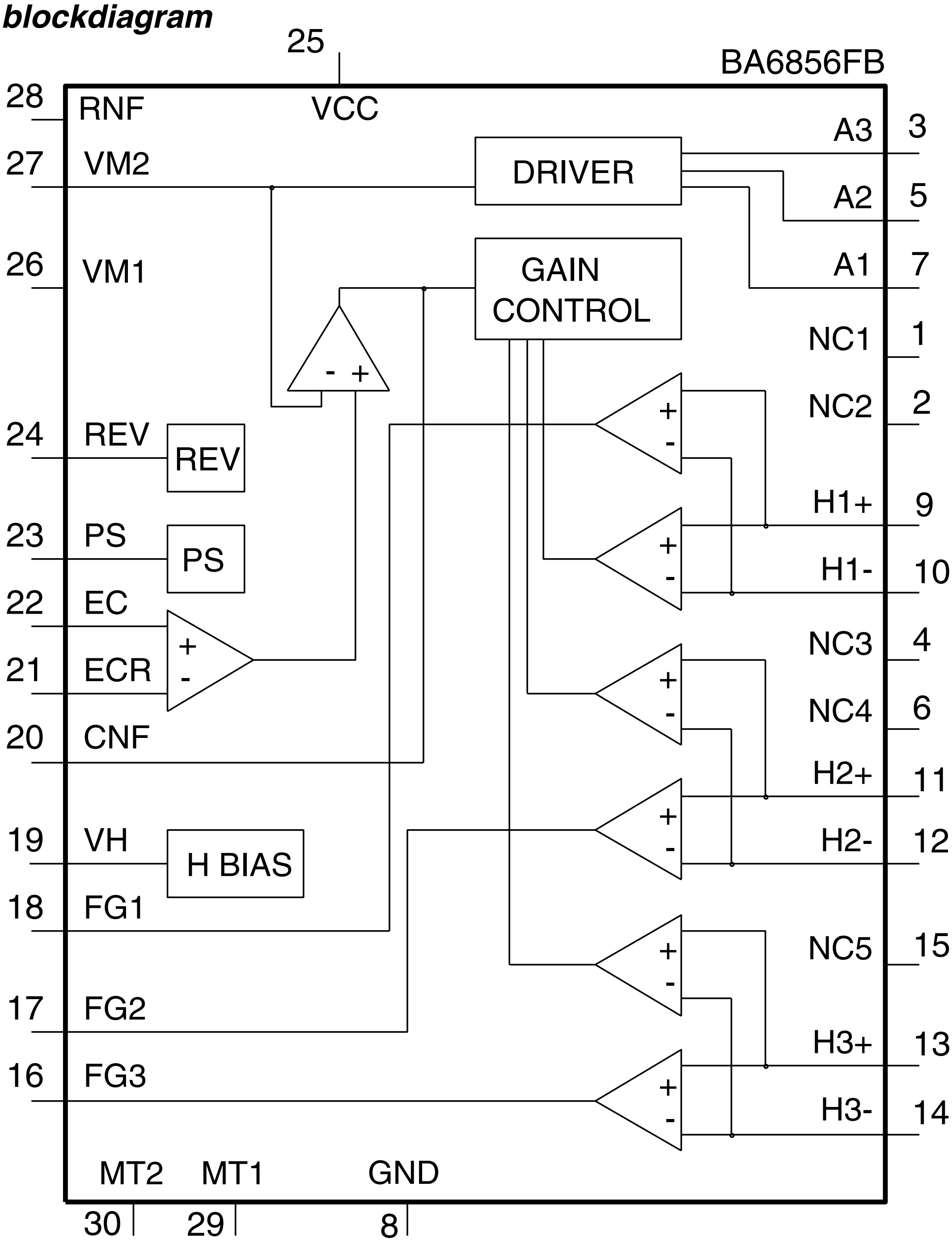
Fig.2 Pin configuration.

BA6856FP: 3 PHASE MOTOR DRIVER FOR DVD PLAYERS

Features

/3-phase, full-wave pseudo linear driving system
built-in power save
built-in therma shut down circuit
built-in current limit circuit
built in Hall bias circuit
built in FG-output (3-phase parallel output)
with switching function of regular/ reverse rotations

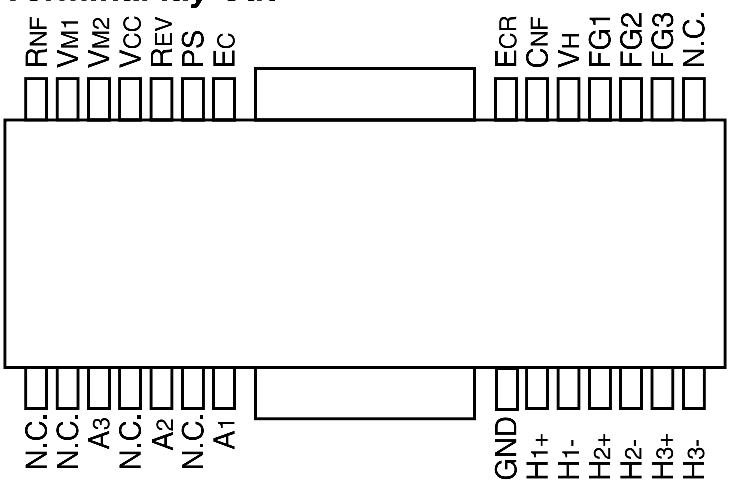
blockdiagram



pin description

PIN No	PIN NAME	DESCRIPTION
1	N.C.	Not connected
2	N.C.	Not connected
3	A_3	Output 3 for motor
4	N.C.	Not connected
5	A_2	Output 2 for motor
6	N.C.	Not connected
7	A_1	Output 1 for motor
8	GND	Ground
9	H_1^+	Hall input Amp1. positive input
10	H_1^-	Hall input Amp1. negative input
11	H_2^+	Hall input Amp2. positive input
12	H_2^-	Hall input Amp2. negative input
13	H_3^+	Hall input Amp3. positive input
14	H_3^-	Hall input Amp3. negative input
15	N.C.	Not connected
16	FG3	FG3 signal output terminal
17	FG2	FG2 signal output terminal
18	FG1	FG1 signal output terminal
19	V_H	Hall Bias
20	C_{NF}	Capacitor connection pin for phase compensation
21	E_{CR}	Torque control standard voltage input terminal
22	E_C	Torque control voltage input terminal
23	PS	POWER SAVE switch
24	R_{EV}	Reverse terminal
25	V_{CC}	Power supply for sinal division
26	V_{M2}	Power supply 2 for driver
27	V_{M1}	Power supply 2 for driver
28	R_{NF}	Power supply for driver division
FIN	FIN	GND

Terminal lay-out



FEATURES

- Compatibility with CD-I, CD-ROM, MPEG-video DVD-ROM and DVD-video applications
- Designed for very high playback speeds
- Typical CD-ROM operation up to n = 12, DVD-ROM to n = 1.9, maximum rates (tbf)
- Matched filtering, quad-pass error correction (C1-C2-C1-C2), overspeed audio playback function included (up to 3 kbytes buffer)
- Lock-to-disc playback, Constant Angular Velocity (CAV), pseudo-Constant Linear Velocity (CLV) and CLV motor control loops
- Interface to 32 kbytes SRAM for DVD error correction and de-interleave
- Sub-code/ header processing for DVD and CD formats
- Programmable HF equalizer
- In DVD mode it is still compatible with Philips block decoders
- Sub-CPU interface can be parallel or fast I^2C-bus
- On-chip clock multiplier.

GENERAL DESCRIPTION

This device is a high-end combined Compact Disc (CD) and Digital Versatile Disc (DVD) compatible decoding device. The device operates with an external 32 kbytes S-RAM memory for de-interleaving operations. The device provides quad-pass error correction for CD-ROM applications (C1-C2-C1-C2) and operates in lock-to-disk, CAV, pseudo CLV and CLV modes.

In DVD modes double-pass C1-C2 error correction is used which is capable of correcting up to 5 C1 frame errors and 16 C2 frame errors.

The SAA7335 contains all the functions required to decode an EFM or EFM+ HF signal directly from the laser pre-amplifier, including analog front-end, PLL data recovery, demodulation and error correction. The spindle motor interface provides both motor control signals from the demodulator and, in addition, contains a tachometer loop that accepts tachometer pulses from the motor unit.

The SAA7335 has two independent microcontroller interfaces. The first is a serial I^2C-bus and the second is a standard 8-bit multiplexed parallel interface. Both of these interfaces provide access to a total of 32 x 8-bit registers for control and status.

This data sheet contains an descriptive overview of the device together with electrical and timing characteristics. For a detailed description of the device refer to the user guide *“SAU/UM96018”*.

Supply of this CD/DVD IC does not convey an implied license under any patent right to use this IC in any CD or DVD application.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_{DDD}	digital supply voltage	4.5	5.0	5.5	V
I_{DDD}	digital supply current	–	70	300	mA
V_{DDA}	analog supply voltage	4.5	5.0	5.5	V
I_{DDA}	analog supply current	–	70	300	mA
f_{xtal}	crystal input frequency	4	25	tbt	MHz
T_{amb}	operating ambient temperature	-20	–	+70	°C
T_{stg}	storage temperature	-55	–	+125	°C

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
SAA7335GP	LQFP100	plastic low profile quad flat package; 100 leads; body 14 x 14 x 1.4 mm	SOT407-1

BLOCK DIAGRAM

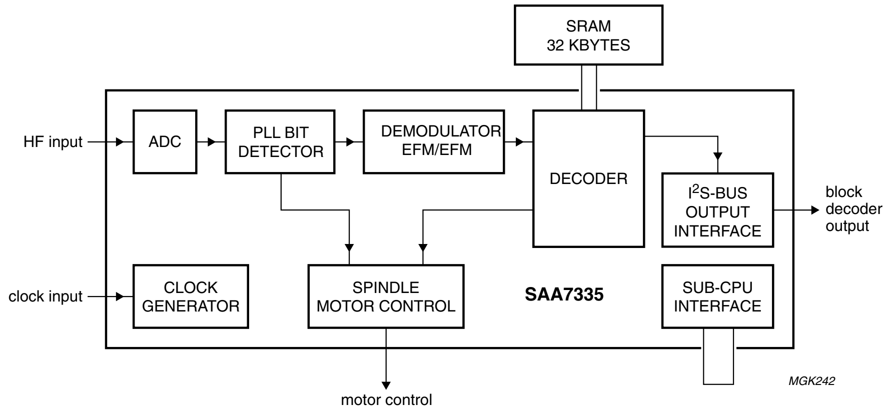


Fig.1 Simplified block diagram.

PINNING

SYMBOL	PIN	TYPE	DESCRIPTION
V_{SSA1}	1	supply	analog ground 1
I_{ref}	2	I	analog current reference input for ADC
REFLo	3	I	analog low reference input for ADC
REFHi	4	I	analog high reference input for ADC
VREF	5	I	analog negative input
HFIN	6	I	analog positive input
V_{SSA2}	7	supply	analog ground 2
AGCOUT	8	O	analog test pin output
V_{DDA2}	9	supply	analog supply voltage 2
V_{DDD1}	10	supply	digital supply voltage 1
V_{SSD1}	11	supply	digital ground 1
OTD	12	I	off track detect input
MOTO1	13	O	3-state motor control output
n.c.	14	–	not connected, reserved
MOTO2/T3	15	I/O	motor control output/tachometer 3 input
n.c.	16	–	not connected, reserved
T1	17	I	tachometer 1 input
T2	18	I	tachometer 2 input
V_{DDD2}	19	supply	digital supply voltage 2
V_{SSD2}	20	supply	digital ground 2
TEST1	21	I	test input 1
TEST2	22	I	test input 2
POR	23	I	power-on reset input
MUXSWICH	24	I	use clock multiplier input
n.c.	25	–	not connected, reserved
CL1	26	O	divided clock output
BCAIN	27	I	BCA input
SDA	28	I/O	sub-CPU I^2C-bus serial data input/output
SCL	29	I	sub-CPU I^2C-bus serial clock input
INT	30	O	sub-CPU interrupt output (open-drain)
V_{DDD3}	31	supply	digital supply voltage 3
V_{SSD3}	32	supply	digital ground 3
da7	33	I/O	sub-CPU data bus bit 7 input/output (parallel)
da6	34	I/O	sub-CPU data bus bit 6 input/output (parallel)
da5	35	I/O	sub-CPU data bus bit 5 input/output (parallel)
n.c.	36	–	not connected, reserved
da4	37	I/O	sub-CPU data bus bit 4 input/output (parallel)
n.c.	38	–	not connected, reserved
da3	39	I/O	sub-CPU data bus bit 3 input/output (parallel)
da2	40	I/O	sub-CPU data bus bit 2 input/output (parallel)

SYMBOL	PIN	TYPE	DESCRIPTION
da1	41	I/O	sub-CPU data bus bit 1 input/output (parallel)
n.c.	42	–	not connected, reserved
da0	43	I/O	sub-CPU data bus bit 0 input/output (parallel)
V_{DDD4}	44	supply	digital supply voltage 4
V_{SSD4}	45	supply	digital ground 4
$\overline{WRi}$	46	I	sub-CPU write enable input (active LOW)
$\overline{RDi}$	47	I	sub-CPU read enable input (active LOW)
ALE	48	I	sub-CPU address latch enable input
CSi	49	I	sub-CPU chip select input (active HIGH)
STOPCLOCK	50	O	stop clock output
n.c.	51	–	not connected, reserved
V4	52	O	serial subcode output (for CD)
EBUOUT	53	O	digital audio output
SYNC	54	O	I^2S-bus sector sync output
FLAG	55	O	I^2S-bus correction ?ag output
DATA	56	O	I^2S-bus serial data output
BCLK	57	I/O	I^2S-bus bit serial clock input/output
WCLK	58	I/O	I^2S-bus word clock input/output
V_{DDD5}	59	supply	digital supply voltage 5
V_{SSD5}	60	supply	digital ground 5
RAMRW	61	O	RAM read/write control output
n.c.	62	–	not connected, reserved
RAMDA7	63	I/O	RAM data bus bit 7 input/output
RAMDA6	64	I/O	RAM data bus bit 6 input/output
RAMDA5	65	I/O	RAM data bus bit 5 input/output
RAMDA4	66	I/O	RAM data bus bit 4 input/output
RAMDA3	67	I/O	RAM data bus bit 3 input/output
RAMDA2	68	I/O	RAM data bus bit 2 input/output
n.c.	69	–	not connected, reserved
RAMDA1	70	I/O	RAM data bus bit 1 input/output
RAMDA0	71	I/O	RAM data bus bit 0 input/output
V_{DDD6}	72	supply	digital supply voltage 6
V_{SSD6}	73	supply	digital ground 6
RAMAD0	74	O	RAM address bit 0 output
RAMAD1	75	O	RAM address bit 1 output
RAMAD2	76	O	RAM address bit 2 output
RAMAD3	77	O	RAM address bit 3 output
RAMAD4	78	O	RAM address bit 4 output
RAMAD5	79	O	RAM address bit 5 output
RAMAD6	80	O	RAM address bit 6 output
V_{DDD7}	81	supply	digital supply voltage 7

SYMBOL	PIN	TYPE	DESCRIPTION
V_{SSD7}	82	supply	digital ground 7
RAMAD7	83	O	RAM address bit 7 output
RAMAD8	84	O	RAM address bit 8 output
RAMAD9	85	O	RAM address bit 9 output
n.c.	86	–	not connected, reserved
RAMAD10	87	O	RAM address bit 10 output
RAMAD11	88	O	RAM address bit 11 output
RAMAD12	89	O	RAM address bit 12 output
RAMAD13	90	O	RAM address bit 13 output
RAMAD14	91	O	RAM address bit 14 output
V_{DDD8}	92	supply	digital supply voltage 8
V_{SSD8}	93	supply	digital ground 8
CRIN	94	I	analog crystal input
CROUT	95	O	analog crystal output
CFLG	96	O	correction statistics output
MEAS1	97	O	front-end telemetry output
V_{DDD9}	98	supply	digital supply voltage 9
V_{SSD9}	99	supply	digital ground 9
V_{DDA1}	100	supply	analog supply voltage 1

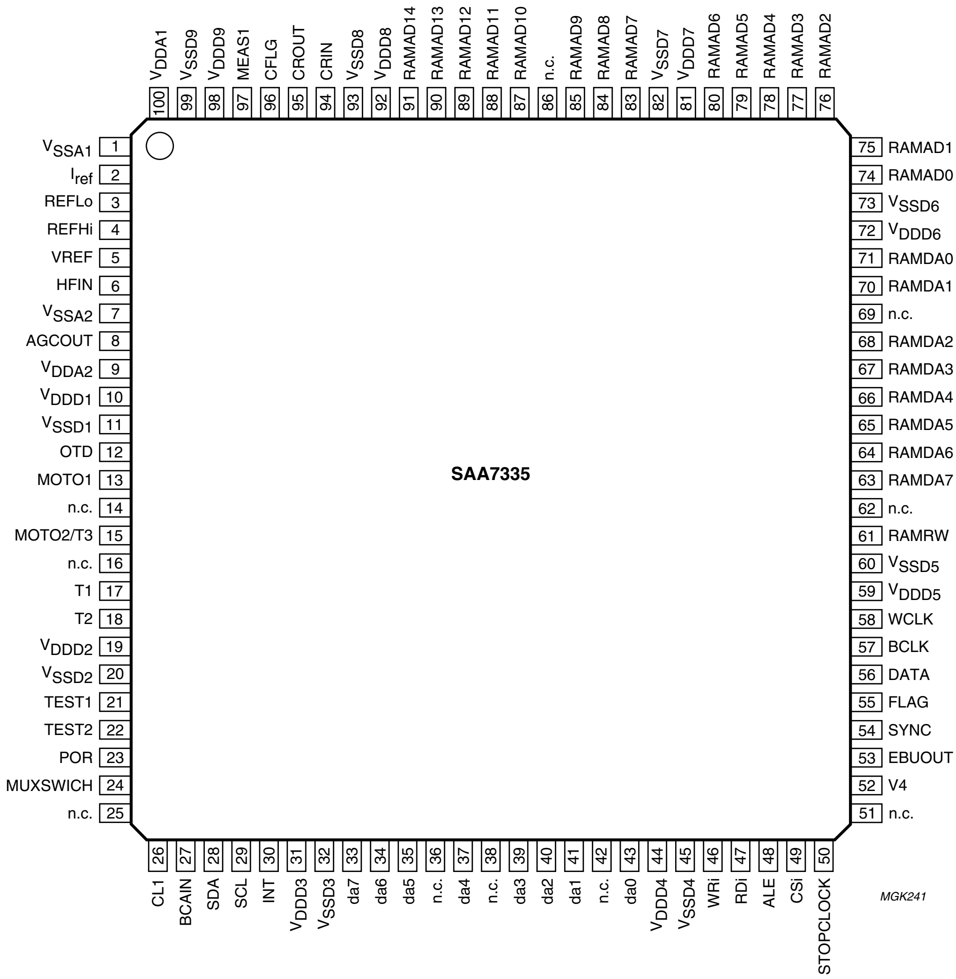


Fig.2 Pin configuration.

FUNCTIONAL DESCRIPTION

Analog front-end

This block converts the HF input to the digital domain using an 8-bit ADC proceeded by an AGC circuit to obtain the optimum performance from the convertor. This block is clocked by ADCCLK which is set by the external crystal frequency plus a flexible clock multiplier and divider block.

PLL and bit detector

This subsystem recovers the data from the channel stream. The block corrects asymmetry, performs noise filtering and equalisation and finally recovers the bit clock and data from the channel using a digital PLL.

The equalizer and the data slicer are programmable.

Digital logic

All the digital system logic is clocked from the master ADC clock (ADCCLK) described above.

Advanced bit detector

The advanced bit detector offers improved data recovery for multi-layer discs and contains two extra detection circuits to increase the margins in the bit recovery block:

1. Adaptive slicer: adds a second stage slicer with higher bandwidth
2. Run length 2 push-back: all T2 run lengths are pushed back to T3, thereby automatically determining the erroneous edge and shifting the transitions on that edge.

Demodulator

FRAME SYNC PROTECTION CD MODE

This circuit detects the frame synchronization signals. Two synchronization counters are used in the SAA7335:

1. The coincidence counter: this is used to detect the coincidence of successive syncs. It generates a sync coincidence signal if 2 syncs are 588 ±1 EFM clocks apart.
2. The main counter: this is used to partition the EFM signal into 17-bit words. This counter is reset when:
   a) A sync coincidence is generated
   b) A sync is found within ±6 EFM clocks of its expected position.

The sync coincidence signal is also used to generate the lock signal which will go active HIGH when 1 sync coincidence is found. It will reset to LOW when, during 61 consecutive frames, no sync coincidence is found.

FRAME SYNC PROTECTION DVD MODE

This circuit detects the frame synchronization signals. Two synchronization counters are used in the SAA7335:

1. The coincidence counter: this is used to detect the coincidence of successive syncs. It generates a sync coincidence signal if 2 syncs are 1488 ±3 EFM+ clocks apart.
2. The main counter: this is used to partition the EFM+ signal into 16-bit words. This counter is reset when:
   a) A sync coincidence is generated
   b) A sync is found within ±10 EFM+ clocks of its expected position.

The sync coincidence signal is also used to generate the lock signal which will go active HIGH when 1 sync coincidence is found. It will reset to LOW when, during 61 consecutive frames, no sync coincidence is found.

EFM/EFM+ demodulation

The 14-bit EFM (16-bit EFM+) data and subcode words are decoded into 8-bit symbols.

Microcontroller interface

The SAA7335 has two microcontroller interfaces, one serial I²C-bus and one parallel (8051 microcontroller compatible).

The two communication modes may be operated at the same time, the modes are described below:

1. Parallel mode: protocol compatible with 8052 multiplexed bus:
   a) da0 to da7 = address/data bus
   b) ALE = Address Latch Enable, latches the address information on the bus
   c) $\overline{\text{WRi}}$ = active LOW write signal for write to SAA7335
   d) $\overline{\text{RDi}}$ = active LOW read signal for read from SAA7335
   e) CSi = active HIGH Chip Select signal (this signal gates the $\overline{\text{RDi}}$ and $\overline{\text{WRi}}$ signals).
2. I²C-bus mode: I²C-bus protocol where SAA7335 behaves as slave device where:
   a) SDA = I²C-bus data
   b) SCL = I²C-bus clock
   c) I²C-bus slave address (write mode) = 3EH
   d) I²C-bus slave address (read mode) = 3FH
   e) Maximum data transfer rate = 400 kbits/s.

MICROCONTROLLER INTERFACE (I²C-BUS MODE)

Bytes are transferred over the interface in single bytes of which there are two types; write data commands and read data commands.

The sequence for a write data command (1 data byte) is as follows:

Send START condition
Send address 3EH (write)
Write command address byte
Write data byte
Send STOP condition.

The sequence for a read data command (that reads 1 data byte) is as follows:

Send START condition
Send address 3EH (write)
Write status address byte
Send STOP condition
Send START condition
Send address 3FH (read)
Read data byte
Send STOP condition.

READING AND WRITING DATA TO THE SAA7335

The SAA7335 has 32 x 8-bit configuration and status registers as shown in Table 1. Not all locations are currently defined and some remain reserved for future upgrades. These can be written to or read from via the microcontroller interface using either the serial or parallel control bus.

Am29LV160BT/Am29LV160BB

16 Megabit (2 M x 8-Bit/1 M x 16-Bit) CMOS 3.0 Volt-only Sector Erase Flash Memory

DISTINCTIVE CHARACTERISTICS

Single power supply operation

— Full voltage range: 2.7 to 3.6 volt read and write operations for battery-powered applications

— Regulated voltage range: 3.0 to 3.6 volt read and write operations and for compatibility with high performance 3.3 volt microprocessors

Manufactured on 0.35 m process technology

Supports Common Flash Memory Interface (CFI)

High performance

— Full voltage range: access times as fast as 90 ns

— Regulated voltage range: access times as fast as 80 ns

Ultra low power consumption (typical values at 5 MHz)

— 200 nA Automatic Sleep mode current

— 200 nA standby mode current

— 10 mA read current

— 20 mA program/erase current

Flexible sector architecture

— One 16 Kbyte, two 8 Kbyte, one 32 Kbyte, and thirty-one 64 Kbyte sectors (byte mode)

— One 8 Kword, two 4 Kword, one 16 Kword, and thirty-one 32 Kword sectors (word mode)

— Supports full chip erase

— Sector Protection features:

A hardware method of locking a sector to prevent any program or erase operations within that sector

Sectors can be locked in-system or via programming equipment

Temporary Sector Unprotect feature allows code changes in previously locked sectors

Top or bottom boot block configurations available

Embedded Algorithms

— Embedded Erase algorithm automatically preprograms and erases the entire chip or any combination of designated sectors

— Embedded Program algorithm automatically writes and verifies data at specified addresses

Minimum 100,000 write cycle guarantee per sector

Package option

— 48-ball FBGA

— 48-ball BGA

— 48-pin TSOP

— 44-pin SO

Compatibility with JEDEC standards

— Pinout and software compatible with single-power supply Flash

— Superior inadvertent write protection

Data# Polling and toggle bits

— Provides a software method of detecting program or erase operation completion

Ready/Busy# pin (RY/BY#)

— Provides a hardware method of detecting program or erase cycle completion (not available on 44-pin SO)

Erase Suspend/Erase Resume

— Suspends an erase operation to read data from, or program data to, a sector that is not being erased, then resumes the erase operation

Hardware reset pin (RESET#)

— Hardware method to reset the device to reading array data

GENERAL DESCRIPTION

The Am29LV160B is a 16 Mbit, 3.0 Volt-only Flash memory organized as 2,097,152 bytes or 1,048,576 words. The device is offered in 48-ball FBGA, 48-ball BGA, 44-pin SO, and 48-pin TSOP packages. The word-wide data (x16) appears on DQ15–DQ0; the byte-wide (x8) data appears on DQ7–DQ0. This device is designed to be programmed in-system with the standard system 3.0 volt V_{CC} supply. A 12.0 V V_{PP} or 5.0 V_{CC} are not required for write or erase operations. The device can also be programmed in standard EPROM programmers.

The device offers access times of 80, 90, and 120 ns, allowing high speed microprocessors to operate without wait states. To eliminate bus contention the device has separate chip enable (CE#), write enable (WE#) and output enable (OE#) controls.

The device requires only a **single 3.0 volt power supply** for both read and write functions. Internally generated and regulated voltages are provided for the program and erase operations.

The Am29LV160B is entirely command set compatible with the **JEDEC single-power-supply Flash standard**. Commands are written to the command register using standard microprocessor write timings. Register contents serve as input to an internal state-machine that controls the erase and programming circuitry. Write cycles also internally latch addresses and data needed for the programming and erase operations. Reading data out of the device is similar to reading from other Flash or EPROM devices.

Device programming occurs by executing the program command sequence. This initiates the **Embedded Program** algorithm—an internal algorithm that automatically times the program pulse widths and verifies proper cell margin. The **Unlock Bypass** mode facilitates faster programming times by requiring only two write cycles to program data instead of four.

Device erasure occurs by executing the erase command sequence. This initiates the **Embedded Erase** algorithm—an internal algorithm that automatically preprograms the array (if it is not already programmed) before executing the erase operation. During erase, the device automatically times the erase pulse widths and verifies proper cell margin.

The host system can detect whether a program or erase operation is complete by observing the RY/BY# pin, or by reading the DQ7 (Data# Polling) and DQ6 (toggle) **status bits**. After a program or erase cycle has been completed, the device is ready to read array data or accept another command.

The **sector erase architecture** allows memory sectors to be erased and reprogrammed without affecting the data contents of other sectors. The device is fully erased when shipped from the factory.

Hardware data protection measures include a low V_{CC} detector that automatically inhibits write operations during power transitions. The **hardware sector protection** feature disables both program and erase operations in any combination of the sectors of memory. This can be achieved in-system or via programming equipment.

The **Erase Suspend/Erase Resume** feature enables the user to put erase on hold for any period of time to read data from, or program data to, any sector that is not selected for erasure. True background erase can thus be achieved.

The **hardware RESET# pin** terminates any operation in progress and resets the internal state machine to reading array data. The RESET# pin may be tied to the system reset circuitry. A system reset would thus also reset the device, enabling the system microprocessor to read the boot-up firmware from the Flash memory.

The device offers two power-saving features. When addresses have been stable for a specified amount of time, the device enters the **automatic sleep mode**. The system can also place the device into the **standby mode**. Power consumption is greatly reduced in both these modes.

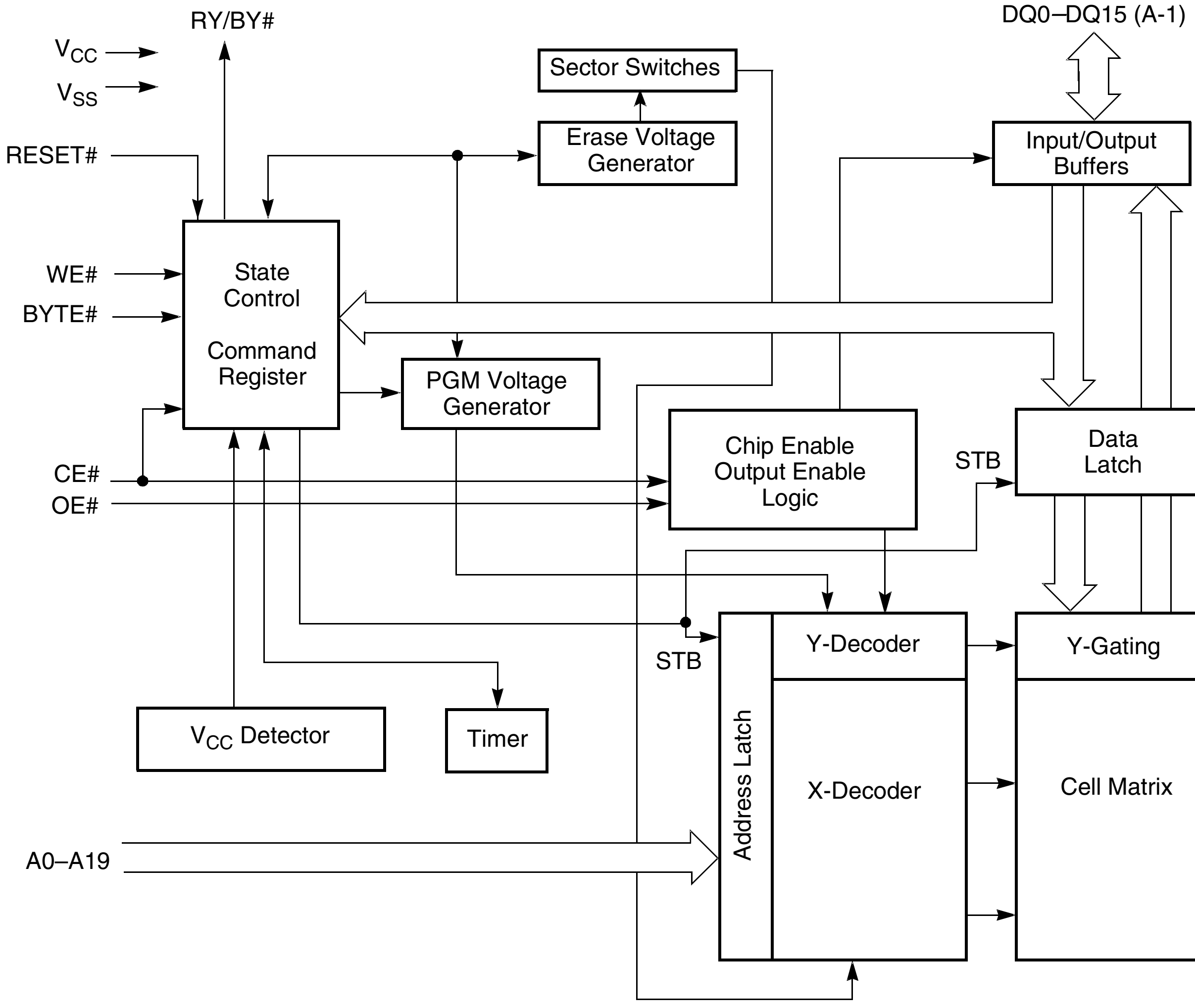
AMD's Flash technology combines years of Flash memory manufacturing experience to produce the highest levels of quality, reliability and cost effectiveness. The device electrically erases all bits within a sector simultaneously via Fowler-Nordheim tunneling. The data is programmed using hot electron injection.

PRODUCT SELECTOR GUIDE

Family Part Number	Am29LV160B		
Ordering Part Number: V_{CC} =3.0–3.6 V	**80R**		
V_{CC} = 2.7–3.6 V		**90**	**120**
Max access time, ns (t_{ACC})	80	90	120
Max CE# access time, ns (t_{CE})	80	90	120
Max OE# access time, ns (t_{OE})	30	35	50

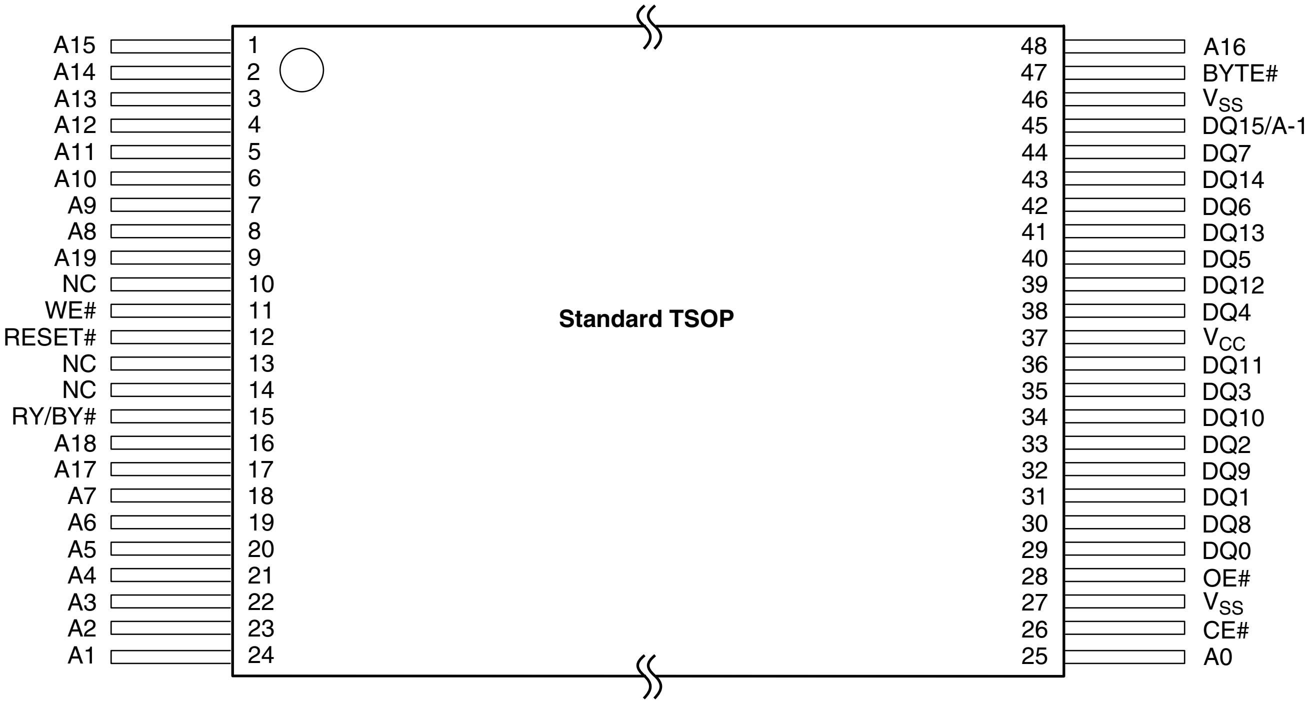
***Note:** See "AC Characteristics" for full specifications.*

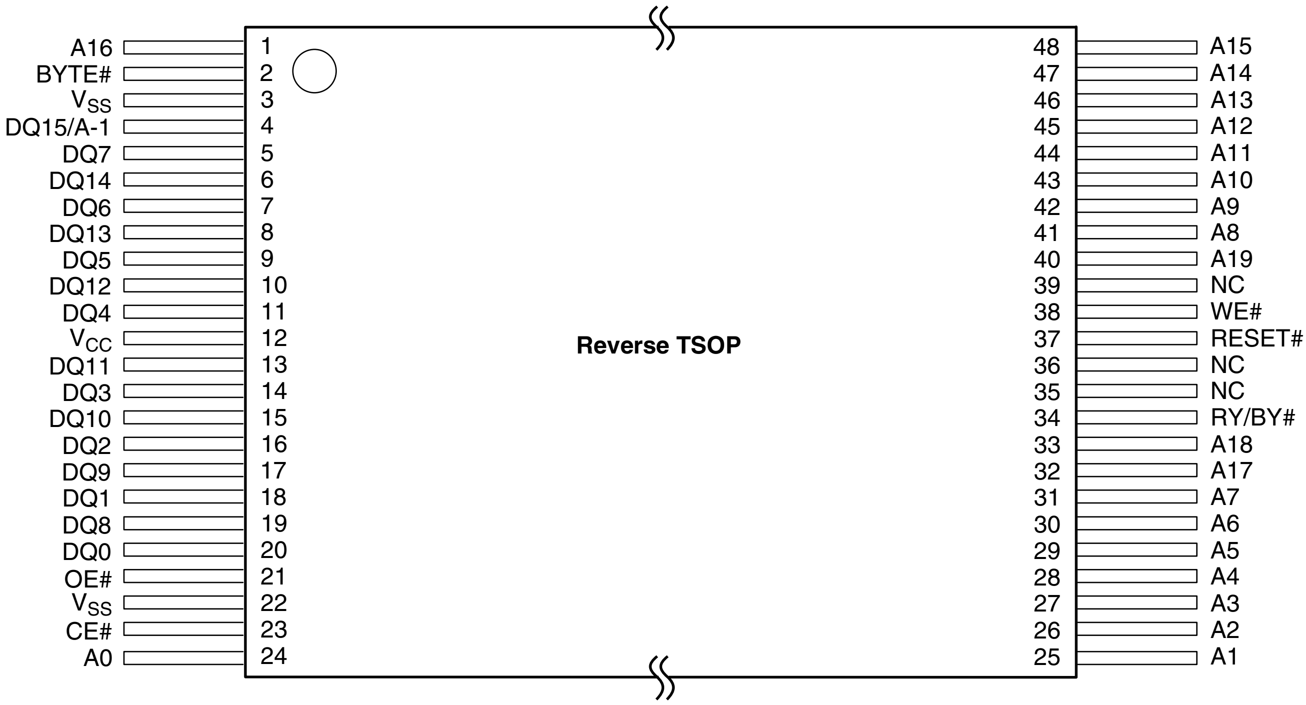
BLOCK DIAGRAM



21358C-1

CONNECTION DIAGRAMS





21358C-2

SYNCHRONOUS DRAM

MT48LC1M16A1 S - 512K x 16 x 2 banks

FEATURES

- PC100 functionality
- Fully synchronous; all signals registered on positive edge of system clock
- Internal pipelined operation; column address can be changed every clock cycle
- Internal banks for hiding row access/precharge 1 Meg x 16 - 512K x 16 x 2 banks architecture with 11 row, 8 column addresses per bank
- Programmable burst lengths: 1, 2, 4, 8 or full page
- Auto Precharge Mode, includes CONCURRENT AUTO PRECHARGE
- Self Refresh and Adaptable Auto Refresh Modes
  - 32ms, 2,048-cycle refresh or
  - 64ms, 2,048-cycle refresh or
  - 64ms, 4,096-cycle refresh
- LVTTL-compatible inputs and outputs
- Single +3.3V ±0.3V power supply
- Supports CAS latency of 1, 2 and 3

OPTIONS — MARKING

OPTIONS	MARKING
• Configuration	
1 Meg x 16 (512K x 16 x 2 banks)	1M16A1
• Plastic Package - OCPL*	
50-pin TSOP (400 mil)	TG
• Timing (Cycle Time)	
6ns (166 MHz)	-6
7ns (143 MHz)	-7
8ns (125 MHz)	-8A
• Refresh	
2K or 4K with Self Refresh Mode at 64ms	S

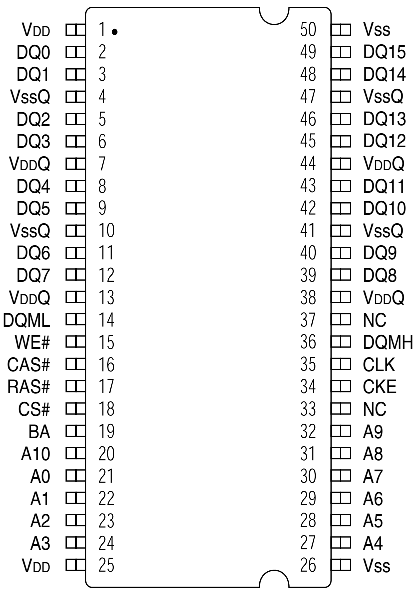
- Part Number Example: MT48LC1M16A1TG-7S

KEY TIMING PARAMETERS

SPEED	CLOCK	ACCESS TIME CL = 3**	SETUP	HOLD
-6	166 MHz	5.5ns	2ns	1ns
-7	143 MHz	5.5ns	2ns	1ns
-8A	125 MHz	6ns	2ns	1ns

*Off-center parting line
**CL = CAS (READ) latency

PIN ASSIGNMENT (Top View)
50-Pin TSOP



Note: The # symbol indicates signal is active LOW.

	1 Meg x 16
Configuration	512K x 16 x 2 banks
Refresh Count	2K or 4K
Row Addressing	2K (A0 A10)
Bank Addressing	2 (BA)
Column Addressing	256 (A0 A7)

16Mb (x16) SDRAM PART NUMBER

PART NUMBER	ARCHITECTURE
MT48LC1M16A1TG S	1 Meg x 16

GENERAL DESCRIPTION

The 16Mb SDRAM is a high-speed CMOS, dynamic random-access memory containing 16,777,216 bits. It is internally configured as a dual 512K x 16 DRAM with a synchronous interface (all signals are registered on the positive edge of the clock signal, CLK). Each of the 512K x 16-bit banks is organized as 2,048 rows by 256 columns by 16 bits. Read and write accesses to the SDRAM are burst oriented; accesses start at a selected location and continue for a programmed number of locations in a programmed

GENERAL DESCRIPTION (continued)

sequence. Accesses begin with the registration of an ACTIVE command, which is then followed by a READ or WRITE command. The address bits registered coincident with the ACTIVE command are used to select the bank and row to be accessed (BA selects the bank, A0-A10 select the row). The address bits registered coincident with the READ or WRITE command are used to select the starting column location for the burst access.

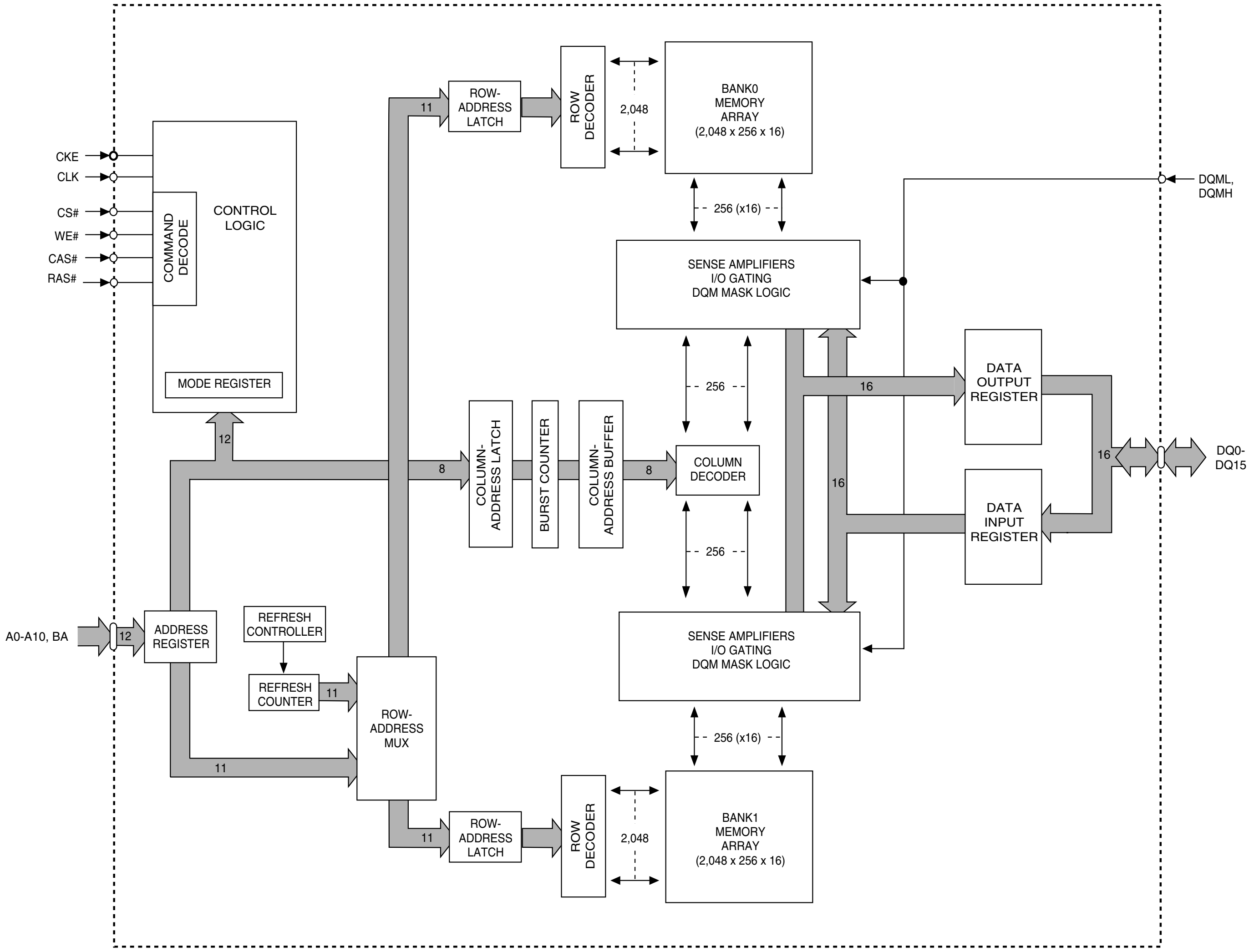
The SDRAM provides for programmable READ or WRITE burst lengths of 1, 2, 4 or 8 locations, or the full page, with a burst terminate option. An AUTO PRECHARGE function may be enabled to provide a self-timed row precharge that is initiated at the end of the burst sequence.

The 1 Meg x 16 SDRAM uses an internal pipelined architecture to achieve high-speed operation. This architecture is compatible with the 2 n rule of prefetch architectures, but it also allows the column address to be changed on every clock cycle to achieve a high-speed, fully random access. Precharging one bank while accessing the alternate bank will hide the PRECHARGE cycles and provide seamless, high-speed, random-access operation.

The 1 Meg x 16 SDRAM is designed to operate in 3.3V, low-power memory systems. An auto refresh mode is provided, along with a power-saving, power-down mode. All inputs and outputs are LVTTL-compatible.

SDRAMs offer substantial advances in DRAM operating performance, including the ability to synchronously burst data at a high data rate with automatic column-address generation, the ability to interleave between internal banks in order to hide precharge time, and the capability to randomly change column addresses on each clock cycle during a burst access.

FUNCTIONAL BLOCK DIAGRAM
1 Meg x 16 SDRAM



PIN DESCRIPTIONS

PIN NUMBERS	SYMBOL	TYPE	DESCRIPTION
35	CLK	Input	Clock: CLK is driven by the system clock. All SDRAM input signals are sampled on the positive edge of CLK. CLK also increments the internal burst counter and controls the output registers.
34	CKE	Input	Clock Enable: CKE activates (HIGH) and deactivates (LOW) the CLK signal. Deactivating the clock provides PRECHARGE POWER-DOWN and SELF REFRESH operations (all banks idle), ACTIVE POWER-DOWN (row ACTIVE in either bank) or CLOCK SUSPEND operation (burst/access in progress). CKE is synchronous except after the device enters power-down and self refresh modes, where CKE becomes asynchronous until after exiting the same mode. The input buffers, including CLK, are disabled during power-down and self refresh modes, providing low standby power. CKE may be tied HIGH.
18	CS#	Input	Chip Select: CS# enables (registered LOW) and disables (registered HIGH) the command decoder. All commands are masked when CS# is registered HIGH. CS# provides for external bank selection on systems with multiple banks. CS# is considered part of the command code.
15, 16, 17	WE#, CAS#, RAS#	Input	Command Inputs: RAS#, CAS# and WE# (along with CS#) define the command being entered.
14, 36	DQML, DQMH	Input	Input/Output Mask: DQM is an input mask signal for write accesses and an output enable signal for read accesses. Input data is masked when DQM is sampled HIGH during a WRITE cycle. The output buffers are placed in a High-Z state (two-clock latency) when DQM is sampled HIGH during a READ cycle. DQML corresponds to DQ0-DQ7; DQMH corresponds to DQ8-DQ15. DQML and DQMH are considered same state when referenced as DQM.
19	BA	Input	Bank Address Inputs: BA defines to which bank the ACTIVE, READ, WRITE or PRECHARGE command is being applied. BA is also used to program the twelfth bit of the Mode Register.
21-24, 27-32, 20	A0-A10	Input	Address Inputs: A0-A10 are sampled during the ACTIVE command (row-address A0-A10) and READ/WRITE command (column-address A0-A7, with A10 defining AUTO PRECHARGE) to select one location out of the 512K available in the respective bank. A10 is sampled during a PRECHARGE command to determine if all banks are to be precharged (A10 HIGH). The address inputs also provide the op-code during a LOAD MODE REGISTER command.
2, 3, 5, 6, 8, 9, 11, 12, 39, 40, 42, 43, 45, 46, 48, 49	DQ0-DQ15	Input/ Output	Data I/Os: Data bus.
33, 37	NC	–	No Connect: These pins should be left unconnected.
7, 13, 38, 44	$V_{DD}Q$	Supply	DQ Power: Provide isolated power to DQs for improved noise immunity.
4, 10, 41, 47	$V_{SS}Q$	Supply	DQ Ground: Provide isolated ground to DQs for improved noise immunity.
1, 25	V_{DD}	Supply	Power Supply: +3.3V ±0.3V.
26, 50	V_{SS}	Supply	Ground.

STi5505 (Rev. Ax)

DVD BACKEND DECODER WITH INTEGRATED HOST PROCESSOR

PRODUCT PREVIEW

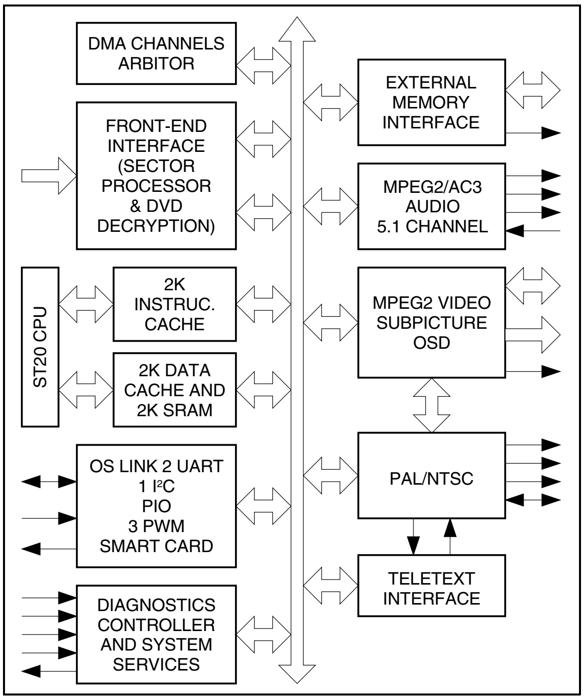
- INTEGRATED 32-BIT RISC HOST CPU
  - 2KBYTES INSTRUCTION CACHE, 2KBYTES DATA CACHE/SRAM
  - 50K DHRYSTONES/SEC (2.1) - 50MHz
- VIDEO DECODER
  - FULLY SUPPORTS MPEG-2 MP@ML
  - MEMORY REDUCTION - PAL IN 12MBITS
- SUBPICTURE DECODER
- HIGH PERFORMANCE ON-SCREEN DISPLAY
- AUDIO DECODER
  - 5.1 CHANNEL DOLBY AC-3® / MULTI CHANNEL MPEG-2 DECODING
  - DOWNMIX TO STEREO OR TO DOLBY PRO-LOGIC COMPATIBLE OUTPUTS FOR MPEG-2 AND AC-3
  - IEC6958 - IEC61937 COMPATIBLE OUTPUT
  - LPCM (DVD) MODE SUPPORTED
  - 6 CHANNELS OUTPUT
- PAL/NTSC ENCODER
  - MACROVISION™ 7.01/6.1 COMPATIBLE
  - TELETEXT, AND CLOSED CAPTION
- HIGH PERFORMANCE SDRAM INTERFACE
- PROGRAMMABLE MEMORY INTERFACE FOR DRAM, ROM, PERIPHERALS ETC.
- FRONT-END CHANNEL IC INTERFACE
  - DVD, VCD AND CD-DA COMPATIBLE
  - DSS - DVB BISTREAMS
  - SERIAL AND PARALLEL INTERFACES
  - HARDWARE SECTOR FILTERING
  - INTEGRATED CSS DECRYPTION AND TRACK BUFFER
- INTEGRATED PERIPHERALS
  - 2 UARTS, 1 I^2C CONTROLLER, 3 PWM OUTPUTS, 3 TIMERS, 3 CAPTURE TIMERS, SMART CARD
  - 34 BITS OF PROGRAMMABLE I/O
  - OS LINK
- PROFESSIONAL TOOLSET SUPPORT
  - ANSI C COMPILER AND LIBRARIES
  - OPERATING SYSTEMS SUPPORT
  - ADVANCED DEBUGGING TOOLS
- 208 PIN PQFP PACKAGE

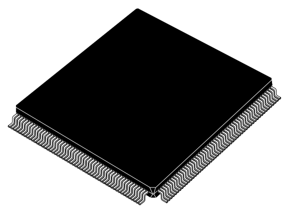
DESCRIPTION

The STi5505 provides a very highly integrated back-end solution for DVD and combo DVD-DVB (Set Top Box) applications. The STi5505 incorporates a host CPU which handles both general application (DVD navigation, CD-DA, VCD, DVB) and drivers of the different embedded periphals (audio/video, subpicture decoders, OSD, PAL/NTSC encoder...).

The STi5505 offers one of the best cost-effective (memory savings, internal peripherals availability) solution to DVD-DVB applications with rapid time to market (Reference design, DVD-DVB Software Toolkit).

Figure 1 : General Block Diagram





PQFP208 (Plastic Quad Flat Pack)
ORDER CODE : STi5505ACV

I - GENERAL DESCRIPTION

The performance offered by the ST20 CPU and its associated hardware (decoders, encoder, peripherals...) allows an integrated and unified DVD or DVD-DVB software solution.

All the following operations are performed inside the STi5505 :

- application management (DVD Navigation, VCD, CD-DA, DVB-Program Guide ...),
- device data retrieval drivers (demultiplex, stream buffer management ...),
- device presentation drivers (video decoder, subpicture decoder, on-screen display, audio decoder, PAL/NTSC encoder ...),
- embedded peripherals drivers (UART, I^2C, Programmable I/O, Smart Card ...).

I.1 - ST20 32-bit CPU

The ST20 micro-core family has been developped by SGS-THOMSON Microelectronics to provide the tools and building blocks to enable the development of highly integrated application-specific 32-bits device at the lowest cost and fastest time to market.

The STi5505 integrates a ST20 C2 core with the following characteristics :

- 50K Dhrystones/s at 50MHz,
- 8/16 bits instructions (32 most common instructions in 8 bits),
- instruction cache 2Kbytes - write back replacement policy,
- internal SRAM 2Kbytes to ensure fast access to critical code, data, interrupt handler ...
- data cache 2 Kbytes - write back replacement policy,

The STi5505's ST20 is provided with advanced debugging tools :

- on-chip real-time emulation,
- debugging with minimal impact on software and performance,
- non intrusive attachment to the host via JTAG (IEEE1149.1),
- no intrusion into the performance of the CPU core,
- no intrusion into user code space by a debug kernel,
- only 40bytes used for breakpoint handler.

I.2 - Video Decoder

The video decoder implemented in the STi5505 uses a patented memory reduction/bandwith reduction scheme to offer the user the best bandwidth/memory size compromise.

The algorithm is lossless and uses "on-the-fly" decoding to reduce the memory requirements to two frame buffers in memory reduction mode.

In this mode, PAL decoding is contained in 12Mbits. When used in bandwith reduction mode, the memory usage is the normal three buffers but the bandwith required by the decoder is significantly reduced compared to a classical implementation.

In summary, the features of the decoder are :

- MPEG-2 Main Profile/Main Level (MP@ML) support,
- MPEG-2 program streams, Packet Elementary streams and MPEG-1 system streams support,
- memory reduction architecture allowing sharing of single 16 Mbits SDRAM between MPEG decoding, micro and transport functions - memory expandable to 32 Mbits of SDRAM,
- letter box (16:9) filter,
- pan-scan, horizontal and vertical image resizing,
- automatic error concealment.

I.3 - Subpicture Decoder

The STi5505 has a hardware DVD compliant subpicture decoder. Subpicture units are copied by DMA into subpicture bit buffer.

The subpicture decoder can decode complete subpicture units without any interaction from the ST20.

The main subpicture decoder features are :

- up to 720x480 or 720x576 subpicture area,
- internal LUTs for Sub Picture, Highlight and PCI (4 bits color and contrast outputs),
- internal color LUT (4 bits from SP, HL, PCI to 24 Y,Cr,Cb bits) for SP color inputs to MPEG, OSD, SP mixer.

I.4 - Audio Decoder

The audio decoder cell is a fully compatible Dolby AC-3 / MPEG-1/MPEG-2 decoder capable of decoding both 5.1 and 2 channel streams compatible with the DVD standard.

Downmix from 5.1 channels is supported for both Dolby and MPEG-2 streams. The output can be sent directly to external DACs or formatted for transmission in accordance with the IE6958 standard.

The decoder can also handle linear PCM in accordance with the DVD standard. An integrated downsampler is provided for conversion from 96 kHz to 48kHz.

I - GENERAL DESCRIPTION (continued)

The main features of the decoder core are :

- Decodes 5.1 Dolby AC-3 Digital surround,
- Output to 6 channels. Downmix modes : 1, 2, 3 or 4 channels for MPEG and AC-3 streams,
- Karaoke mode for DVD. MPEG-2 capable, AC-3 capable,
- MPEG-1, 2-channel audio decoder layers 1 and 2,
- MPEG-2, 6-channel audio decoder layer 2,
- PCM : transparent. downsampling 96 to 48 kHz,
- Accepts MPEG-2 PES stream format for : MPEG-2, MPEG-1, Dolby AC-3 and Linear PCM,
- IEC6958 Output Interface,
- CD-DA PCM format (subcode output in IEC6958 user data),
- Downmix for Dolby Pro Logic compatible outputs for AC-3 and MPEG-2 (Pro Logic encoder),
- Pro Logic decoder,
- PLL for Internal 44.1 and 48kHz PCM clock generation,
- On chip pink noise generator.

I.5 - High Performance On-Screen Display

The graphics performance of the STi5505 supports the new requirements for intelligent program guides and interactive applications.

The display interface supports up to 256 colors for each OSD region and a transparency feature allows mixing of video with the OSD. Fast access graphics and many other additional features are available and are supported by a graphics library.

Very high system performance is obtained by closely coupling the ST20 RISC processor and cache with the MPEG audio/video core and display memory.

Low latency RISC access and DMA engines allow rapid construction of bit maps.

I.6 - PAL/NTSC Encoder

The STi5505 integrates a PAL/NTSC encoder. It converts the digital MPEG/Sub Picture/OSD stream into a standard analog baseband PAL/NTSC signal and into RGB analog components. Six analog output pins are available on which it is possible to output CVBS, S-VHS (Y/C) and RGB formats.

The encoder handles interlaced and non-interlaced mode.

It can perform Closed Captions, CGMS or Teletext encoding and allows Macrovision 7.01/6.1 copy protection.

The encoder supports both master and slave modes for synchronization.

I.7 - Memory Interfaces

The STi5505 has been designed to minimize system costs by enabling various memory savings. Two kinds of memory interfaces are used on the STi5505 : a programmable External Memory Interface (EMI) and a high performance SDRAM interface.

The External Memory Interface supports several address ranges (memory banks). In each bank, a set of signals are entirely programmable and can be used to map 8/16 bits peripherals such as Front End channel ICs in DVD applications.

The EMI contains a zero glue logic DRAM and a low-cost EPROM interface.

This interface can be programmed to interface very easily peripherals.

The SDRAM memory interface supports gluelessly 125 MHz SDRAMs providing the adequate bandwiths to achieve MPEG decoding and display, OSD drawing and display, and general system use.

Memory savings can be realized on ROM requirements too : the ST20 VL-RISC micro-core has the highest code density of any 32 bit CPU, leading to the lowest cost program ROM.

I.8 - Front-End Interface

The STi5505 's front end interface accepts :

- DVD, VCD and CD-DA sectors,
- DVB-DSS transport stream.

In DVD mode, DVD, VCD and CD-DA information can be input into STi5505 through a serial interface or a generic parallel interface.

In serial mode, data are captured and filtered from I2S and V4 interfaces by an internal sector processor. V4 interface is used to capture VCD and CD-DA subcode information. In parallel mode, sector processor is bypassed.

I - GENERAL DESCRIPTION (continued)

The main features of the DVD interface are :
- DVD, VCD and CD-DA compatible,
- hardware sector filtering,
- subcode error correction for CD-DA,
- integrated CSS decryption,
- integrated track buffer support,
- DMA engine to ST20 memory.

In DVB-DSS mode, DVB-DSS transport stream is input through a serial interface. The STi5505 extracts and descrambles Packet Elementary Streams belonging to one user selected program to be decoded and presented.

The main features of the DVB-DSS interface are :
- descrambling (transport packet and packet elementary streams in DVB mode, transport packet in DSS mode ; up to 32 streams descrambling),
- PID and section filtering,
- clock recovery,
- DMA engine.

In DVB-DSS mode, a high speed digital interface allows to transfer packets between the Set Top Box and external units, either for recording or playback purposes. This interface provides also full support for an external IEEE1394 connection.

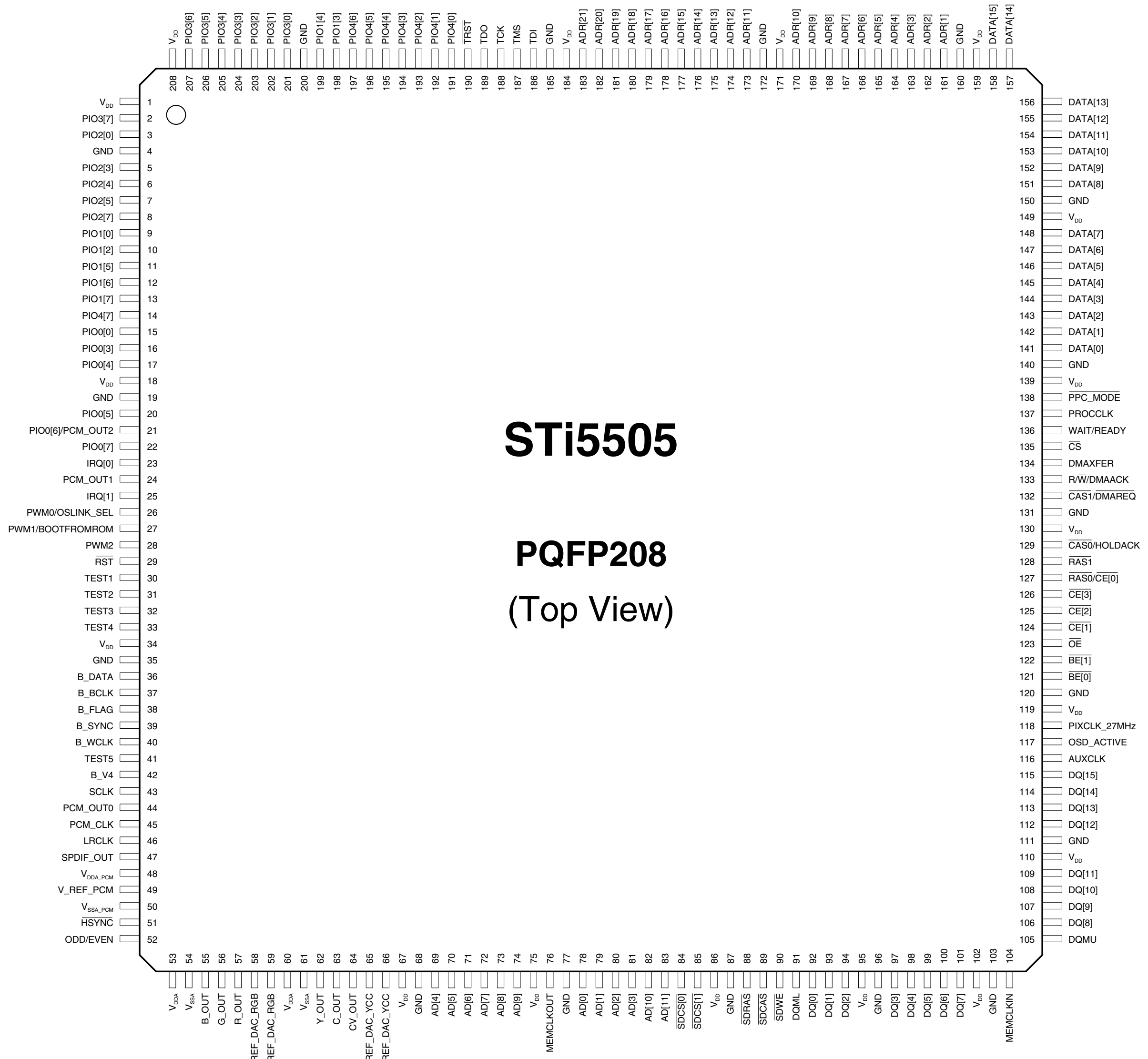
I.9 - Integrated Peripherals

Several peripherals generally used in DVD players or DVD-DVB combos have been integrated into the STi5505.

They are :
- two UARTs to interface remote control receivers, DVD front end, modem ...,
- one I^2C controller to interface serial memories, remote control receivers, microcontrollers...,
- 2 SmartCard interfaces (ISO7816-3) for DVB-DSS conditionnal access, pay per view ...,
- PWM/timer module for control of system clock,
- 34 programmable I/O pins,
- OS Link interface,
- JTAG with boundary scan for debug.

II - PIN DESCRIPTION

II.1 - Pin Connections



II - PIN DESCRIPTION (continued)

II.2 - Pin List

Pin	Name	Type	Function
SUPPLIES			
1, 18, 34, 67, 75, 86, 95, 102, 110, 119, 130, 139, 149, 159, 171, 184, 208	V_{DD}		Power Supply
4, 19, 35, 68, 77, 87, 96, 103, 111, 120, 131, 140, 150, 160, 172, 185, 200	GND		Ground
53, 60	V_{DDA}		Analog Power Supply for DENC D/A Converters
54, 61	V_{SSA}		Analog Ground for DENC D/A Converters
48	V_{DDA_PCM}		Analog Power Supply for PLL PCM
49	V_REF_PCM		Analog Reference for PLL PCM
50	V_{SSA_PCM}		Analog Ground for PLL PCM
FRONT-END INTERFACE			
36	B_DATA	I	I^2S Data (DVD) or PARA_DATA[2] (DVD//) or Link Data (DVB/DSS)
40	B_WCLK	I/O	I^2S Word Clock or PARA_DATA[6] (DVD//) or NRSS_CLK (DVB/DSS)
37	B_BCLK	I	I^2S Bit Clock (DVD) or PARA_DATA[3] (DVD//) or Link Bit Clock (DVB/DSS)
38	B_FLAG	I	Error Flag (DVD) or PARA_DATA [4] (DVD//) or Link Sync (DVB/DSS)
39	B_SYNC	I	Sector / Abs Time Sync (DVD) or PARA_DATA[5] (DVD//) or Link Not Valid (DVB/DSS)
42	B_V4	I	Versatile Input Pin (Subcode Input) or PARA_DATA[7] (DVD//) or NRSS_IN (DVB/DSS)
VIDEO OUTPUT INTERFACE			
57	R_OUT	O	Red Output
56	G_OUT	O	Green Output
55	B_OUT	O	Blue Output
63	C_OUT	O	Chroma Output
64	CV_OUT	O	Composite Video Output
62	Y_OUT	O	Luma Output
59	I_REF_DAC_RGB	I	DAC Current Reference
66	I_REF_DAC_YCC	I	DAC Current Reference
58	V_REF_DAC_RGB	I	DAC Voltage Reference
65	V_REF_DAC_YCC	I	DAC Voltage Reference
117	OSD_ACTIVE	I/O	OSD Active
118	PIXCLK_27MHz	I	System Clock Input
51	$\overline{\text{HSYNC}}$	I/O	Horizontal Sync
52	ODD/EVEN	I/O	Vertical Sync
AC-3/MPEG1-2 AUDIO OUTPUT INTERFACE			
43	SCLK	O	Serial Bit Clock
44	PCM_OUT0	O	Audio Serial Output Data 0
24	PCM_OUT1	O	Audio Serial Output Data 1
21	PCM_OUT2	O	Audio Serial Output Data 2
45	PCM_CLK	I/O	PCM Clock In or Out
46	LRCLK	O	Left/Right Clock
47	SPDIF_OUT	O	SPDIF Output

II - PIN DESCRIPTION (continued)

II.2 - Pin List (continued)

Pin	Name	Type	Function
EXTERNAL INTERRUPTS			
23, 25	IRQ[0:1]	I	External Interrupts
PROGRAMMABLE I/O AND ALTERNATE FUNCTION (see Device Configuration Chapter)			
15	PIO0 [0]	I/O	General Purpose I/O or PARA_SYNC (DVD//Front End) or Sc1Data (Smart Card 1 Data I/O)
16	PIO0 [3]	I/O	General Purpose I/O or PARA_REQ (DVD//Front End) or Sc1Clk (Smart Card 1 Clock)
17	PIO0 [4]	I/O	General Purpose I/O or PARA_STR (DVD//Front End) or Sc1RST (Smart Card 1 Reset)
20	PIO0 [5]	I/O	General Purpose I/O or PARA_DATA[0] (DVD//Front End) or Sc1Cmd V_{CC} (Smart Card 1 Voltage Enable)
21	PIO0 [6]	I/O	General Purpose IO or Sc1DataDir (Smart Card 1 Dir)
22	PIO0 [7]	I/O	General Purpose I/O or PARA_DATA[1] (DVD//Front End) or Sc1Detect(Smart Card 1 Detect)
9	PIO1 [0]	I/O	General Purpose I/O or I^2C Data
10	PIO1 [2]	I/O	General Purpose I/O or I^2C Clock
198, 199	PIO1 [3:4]	I/O	General Purpose IO
11	PIO1 [5]	I/O	General Purpose IO or ASC1 TXD
12	PIO1 [6]	I/O	General Purpose IO or ASC1 RXD
13	PIO1 [7]	I/O	General Purpose IO or ASC3 TXD
3	PIO2 [0]	I/O	General Purpose I/O or Sc0Data (Smart Card 0 Data I/O)
5	PIO2 [3]	I/O	General Purpose I/O or Sc0Clk (Smart Card 0 Clock)
6	PIO2 [4]	I/O	General Purpose I/O or Sc0RST (Smart Card 0 Reset)
7	PIO2 [5]	I/O	General Purpose I/O or Sc0CmdV_{CC} (Smart Card 0 Voltage Enable)
8	PIO2 [7]	I/O	General Purpose I/O or Sc0Detect (Smart Card 0 Detect)
201	PIO3 [0]	I/O	General Purpose IO or OSLink In
202	PIO3 [1]	I/O	General Purpose IO or OSLink Out
203	PIO3 [2]	I/O	General Purpose IO or CPUReset
204	PIO3 [3]	I/O	General Purpose IO or CPU Analyse
205	PIO3 [4]	I/O	General Purpose IO or ErrorOut
206, 207, 2	PIO3 [5:7]	I/O	General Purpose IO
191-197	PIO4 [0:6]	I/O	General Purpose IO
14	PIO4 [7]	I/O	General Purpose IO or ASC3 RXD
JTAG INTERFACE			
188	TCK	I	Test Clock
186	TDI	I	Test Data Input
189	TDO	O	Test Data Input
187	TMS	I	Test Mode Select
190	$\overline{TRST}$	I	Test Reset
SYSTEM USE			
28	PWM2	O	PWM2 Output
27	PWM1/BOOTFROMROM	O/I	PWM1 Output or Configuration Oslink Pins
26	PWM0/OSLINK_SEL	O/I	PWM0 Output or Boot from ROM during Reset
29	$\overline{RST}$	I	Reset
116	AUXCLK	O	Auxilary Clock for Any Purpose

II - PIN DESCRIPTION (continued)

II.2 - Pin List (continued)

Pin	Name	Type	Function
SDRAM INTERFACE			
78-81, 69, 70-74, 82, 83	AD[0:11]	O	SDRAM Address Bus
92-94, 97-101, 106-109, 112-115	DQ[0:15]	I/O	SDRAM Data (Lower Byte)
84, 85	$\overline{\text{SDCS}}$[0:1]	O	SDRAM Chip Selects
89	$\overline{\text{SDCAS}}$	O	SDRAM CAS
88	$\overline{\text{SDRAS}}$	O	SDRAM RAS
90	$\overline{\text{SDWE}}$	O	SDRAM Write Enable
104	MEMCLKIN	I	SDRAM Memory Clock Input
76	MEMCLKOUT	O	SDRAM Memory Clock Output
91	DQML	O	DQ Mask Enable (Lower)
105	DQMU	O	DQ Mask Enable (Upper)
EXTERNAL MEMORY INTERFACE			
161-170, 173-183	ADR[1:21]	I/O	External Memory Address Bus
141-148, 151-158	DATA[0:15]	I/O	External Memory Data Bus
128	$\overline{\text{RAS1}}$/HOLDREQ	O	DRAM RAS or reserved
136	WAIT/READY	I/O	External Wait States or Reserved
133	R/$\overline{\text{W}}$/DMAACK	I/O	DRAM R/$\overline{\text{W}}$ Strobe or Reserved
121, 122	$\overline{\text{BE}}$[0:1]	O	Byte enable
129	$\overline{\text{CAS0}}$/HOLDACK	O/I	DRAM CAS or Reserved
132	$\overline{\text{CAS1}}$/DMAREQ	O	DRAM CAS or Reserved
124-126	$\overline{\text{CE}}$[1:3]	O	Chip Select for Banks 1 - 3
135	$\overline{\text{CS}}$	I	Reserved
137	PROCCLK	I/O	ST20 Clock or Reserved
127	$\overline{\text{RAS0}}$/$\overline{\text{CE0}}$	O	DRAM RAS or Chip Select for Bank 0
134	DMAXFER	I	Reserved
138	$\overline{\text{PPC_MODE}}$	I	Reserved
123	$\overline{\text{OE}}$	I/O	Output Enable or Reserved
SDAV/P1394 INTERFACE			
30	TEST1	I/O	DATA_RX/STROBE_TX (SDAV Mode) or SDAV_CLK (P1394 Mode)
31	TEST2	I/O	STROBE_RX/DATA_TX (SDAV Mode) or DATA_IN/DATA_OUT (P1394 Mode)
32	TEST3	I/O	Direction (SDAV Mode) or DATA_VALID In/Out (P1394 Mode)
MISCELLANEOUS			
41	TEST5	O	NRSS_OUT (DVB/DSS)

III - FUNCTIONAL DESCRIPTION

III.1 - Functional Modules

Figure 1 shows the subsystem modules that make up the STi5505. These modules are outlined below.

III.1 - CPU

The Central Processing Unit (CPU) on the STi5505 is the ST20-C2 32-bit processor core. It contains instruction processing logic, instruction and data pointers and an operand register. It directly accesses the high speed on-chip SRAM memory, which can store data or programs, and uses the Caches to reduce access time to off chip program and data memory.

The processor can access memory via the general purpose External Memory Interface (EMI) or via the SDRAM EMI which is shared with the MPEG decoder.

III.2 - Memory Subsystem

The STi5505 on-chip SRAM memory system provides 160 Mbytes/s internal data bandwidth, supporting pipelined 2 cycles internal memory access at 25ns cycle times. The STi5505 memory system consists of 2 Kbytes of SRAM, 2Kbytes of instruction cache, a 2Kbytes data cache that can be programmed to be SRAM, and an external memory interface (EMI).

The STi5505 product has 2 Kbytes of on-chip SRAM. The advantage of this is the ability to store time critical code on chip, for instance interrupt routines, software kernels or device drivers, and even frequently used data without these being flushed from the caches.

The instruction and data caches are direct mapped with a write-back system for the data cache and support burst accesses to the external memories for refill and write-back which are effective for increasing performance with page-mode and SDRAM memories.

The STi5505 EMI controls access to the external memory and peripherals while the SDRAM EMI provides access to the SDRAM buffer for the MPEG decoders, ST20 and DMA peripherals.

The STi5505 EMI can access a 16 Mbytes (or greater if DRAM is used) physical address space in each of the four general purpose memory banks, and provides sustained transfer rates of up to 80 Mbytes/s. Peripherals that support an asynchronous data acknowledge are supported as is an external Power PC which can share the bus with the STi5505 and access the SDRAM buffer through the device.

High memory bandwidths up to 200 Mbytes/s can be supported by the SDRAM EMI.

The STi5505 internal memory interconnect provides buffering and arbitration of memory access requests to sustain very high throughput of memory accesses.

III.3 - Syste m Services Module

The STi5505 system services module includes :

- Phase locked loop (PLL) - accepts 27MHz input and generates all the internal high frequency clocks needed for the CPU and the OS-Link.
- test access port - JTAG compatible.
- Diagnostics controller accessed via the JTAG port providing :
- Bootstrapping during development
- Hardware breakpoint and watchpoint
- Real time trace
- External LSA triggering support.

III.4 - Serial Communications

To facilitate the connection of this system the front end device and other peripherals, two UARTs (ASCs) are included in the device. The UARTs provide an asynchronous serial interface.

The UART can be programmed to support a range of baud rates and data formats, for example, data size, stop bits and parity. Two synchronous serial communications (SSC) interfaces are provided on the device. These can be used for a remote control device for example via an I^2C or SPI bus.

III.5 - Interrupt Subsystem

The STi5505 interrupt subsystem supports eight prioritized interrupt levels. Two external interrupt pins are provided. Level assignment logic allows any of the internal or external interrupts to be assigned and, if necessary, share any interrupt level.

III.6 - Front End Interf ace & DVD Decryption

The front end interface accepts sectors in the case of DVD, MPEG-1 system stream in the case of VCD and PCM data for CD-DA applications on an I2S interface. In the case of VCD and CD-DA disks the subcode information is input via a simple asynchronous serial interface similar to a UART.

The bitstream and subcode stream then pass through a "sector processor" block which handles sector filtering in the case of DVD and sectorizing using the subcode stream for VCD and CD-DA systems.

III - FUNCTIONAL DESCRIPTION (continued)

The block also handles overspeed processing for all systems. The capturing of CD-DA sectors is based on a flywheel tiner to improve robusters by concealing erros in the subcode stream. For DVD the data, having had sector headers removed, then passes through a DVD conformant de-cryption stage and is written into any of the system memories using a programmable DMA engine. When a subcode stream is present it is locally buffered, by subcode block and can be read by the CPU for subsequent processing, if required.

III.7 - PWM and counter module

This unit includes three separate pulse width modulator (PWM) generators using a shared counter, and three timer compare and capture channels sharing a second counter.

The counters can be clocked from a pre-scaled internal clock or from a pre-scaled external clock via the capture clock input and the event on which the timer value is captured is also programmable.

The PWM counters are 8-bit with 8-bit registers to set the output high time. The capture/compare counter and the compare and capture registers are 32-bit.

III.8 - Parallel Programmable IO module

40 bits of parallel I/O are provided. 34 of then are connected to actual PIO pins. Each bit is programmable as an output or an input. The output can be configured as a totem pole or open drain driver. Input compare logic is provided which can generate an interrupt on any change on any input bit.

Many pins of the STi5505 device are multi-function and can either be configured as PIO or connected to an internal peripheral signal.

III.9 - MPEG Video decoder

The video decoder is a real-time video compression processor supporting the MPEG-1 and MPEG-2 standards at video rates up to 720 x 480 x 60 Hz and 720 x 576 x 50 Hz. Picture format conversion for display is performed by vertical and horizontal filters. User-defined bitmaps may be superimposed on the display picture through use of the on-screen display function.

III.10 - PAL/NTSC encoder

The digital encoder which is integrated in the STi5505 converts a multiplexed 4:2:2 YUV stream into a standard analog baseband PAL/NTSC signal and into RGB analog components. The encoder can also perform closed-caption, CGMS or teletext encoding and allows Macrovision^{TM} 7.01/6.1 copy protection.

III.11 - MPEG-2 Audio / Dolby AC-3 Decoder

The audio decoder is a Dolby AC-3 decoder capable of decoding both 5.1 and 2 channel DVD comformant bitstreams. The decoder also handles MPEG-1 (layers 1 & 2) and MPEG-2 layer 2 (6 channels). Downmix to 2 channels is possible for Dolby and MPEG standards with optional pro-logic encoding.

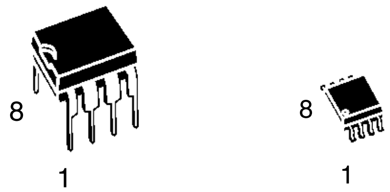
The decoder directly accepts MPEG-2 PES streams as input. The decoder is capable of supporting IEC6958-IEC61937 formatted outputs for AC-3 and MPEG audio, linear PCM (left & right,16, 18, 20 & 24 bits), zero output (Mute mode) and PCM audio.

ST24E32
ST25E32

32K SERIAL I²C EEPROM with EXTENDED ADDRESSING

NOT FOR NEW DESIGN

- COMPATIBLE with I²C EXTENDED ADDRESSING
- TWO WIRE SERIAL INTERFACE, SUPPORTS 400kHz PROTOCOL
- 1 MILLION ERASE/WRITE CYCLES, OVER the FULL SUPPLY VOLTAGE RANGE
- 40 YEARS DATA RETENTION
- SINGLE SUPPLY VOLTAGE
  - ± 4.5V to 5.5V for ST24E32 version
  - ± 2.5V to 5.5V for ST25E32 version
- WRITE CONTROL FEATURE
- BYTE and PAGE WRITE (up to 32 BYTES)
- BYTE, RANDOM and SEQUENTIAL READ MODES
- SELF TIMED PROGRAMING CYCLE
- AUTOMATIC ADDRESS INCREMENTING
- ENHANCED ESD/LATCH UP PERFORMANCES
- ***ST24E32 and ST25E32 are replaced by the M24C32***



PSDIP8 (B)
0.25mm Frame

SO8 (M)
200mil Width

DESCRIPTION

The ST24/25E32 are 32K bit electrically erasable programmable memories (EEPROM), organized as 8 blocks of 512 x 8 bits. The ST25E32 operates with a power supply value as low as 2.5V. Both Plastic Dual-in-Line and Plastic Small Outline packages are available.

Table 1. Signal Names

Signal	Description
E0 - E2	Chip Enable Inputs
SDA	Serial Data Address Input/Output
SCL	Serial Clock
$\overline{WC}$	Write Control
V_{CC}	Supply Voltage
V_{SS}	Ground

Figure 1. Logic Diagram

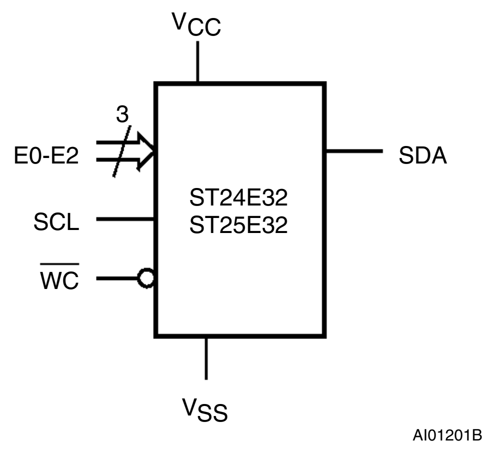


Figure 2A. DIP Pin Connections

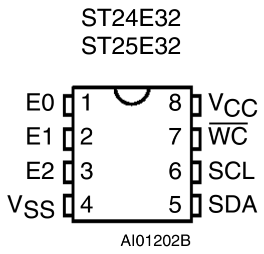


Figure 2B. SO Pin Connections

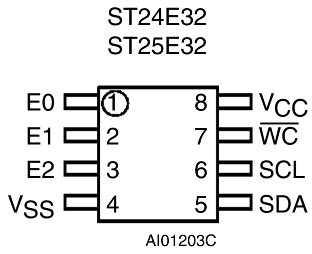


Table 2. Absolute Maximum Ratings (1)

Symbol	Parameter	Value	Unit
T_A	Ambient Operating Temperature	±40 to 125	°C
T_{STG}	Storage Temperature	±65 to 150	°C
T_{LEAD}	Lead Temperature, Soldering (SO8) 40 sec (PSDIP8) 10 sec	215 260	°C
V_{IO}	Input or Output Voltages	±0.6 to 6.5	V
V_{CC}	Supply Voltage	±0.3 to 6.5	V
V_{ESD}	Electrostatic Discharge Voltage (Human Body model) (2)	4000	V
	Electrostatic Discharge Voltage (Machine model) (3)	500	V

Notes: 1. Except for the rating "Operating Temperature Range", stresses above those listed in the Table "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only and operation of the device at these or any other conditions above those indicated in the Operating sections of this specification is not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability. Refer also to the SGS-THOMSON SURE Program and other relevant quality documents.
2. 100pF through 1500 ; MIL-STD-883C, 3015.7
3. 200pF through 0 ; EIAJ IC-121 (condition C)

DESCRIPTION (cont'd)

Each memory is compatible with the I^2C extended addressing standard, two wire serial interface which uses a bi-directional data bus and serial clock. The ST24/25E32 carry a built-in 4 bit, unique device identification code (1010) corresponding to the I^2C bus definition. The ST24/25E32 behave as slave devices in the I^2C protocol with all memory operations synchronized by the serial clock. Read and write operations are initiated by a START condition generated by the bus master. The START condition is followed by a stream of 4 bits (identification code 1010), 3 bit Chip Enable input to form a 7 bit Device Select, plus one read/write bit and terminated by an acknowledge bit.

9.24 Description of Furore IC

9.24.1 General Description

FURORE-IC is a one-chip design containing all the hardware required for SACD processing. It is intended to interface to the Sti family (Sti5505/Sti5508) DVD video decoders.
The FURORE-IC contains a memory interface to support one 4M*16 SDRAM or one 1M*16 SDRAM device.

9.24.2 Blockdiagram

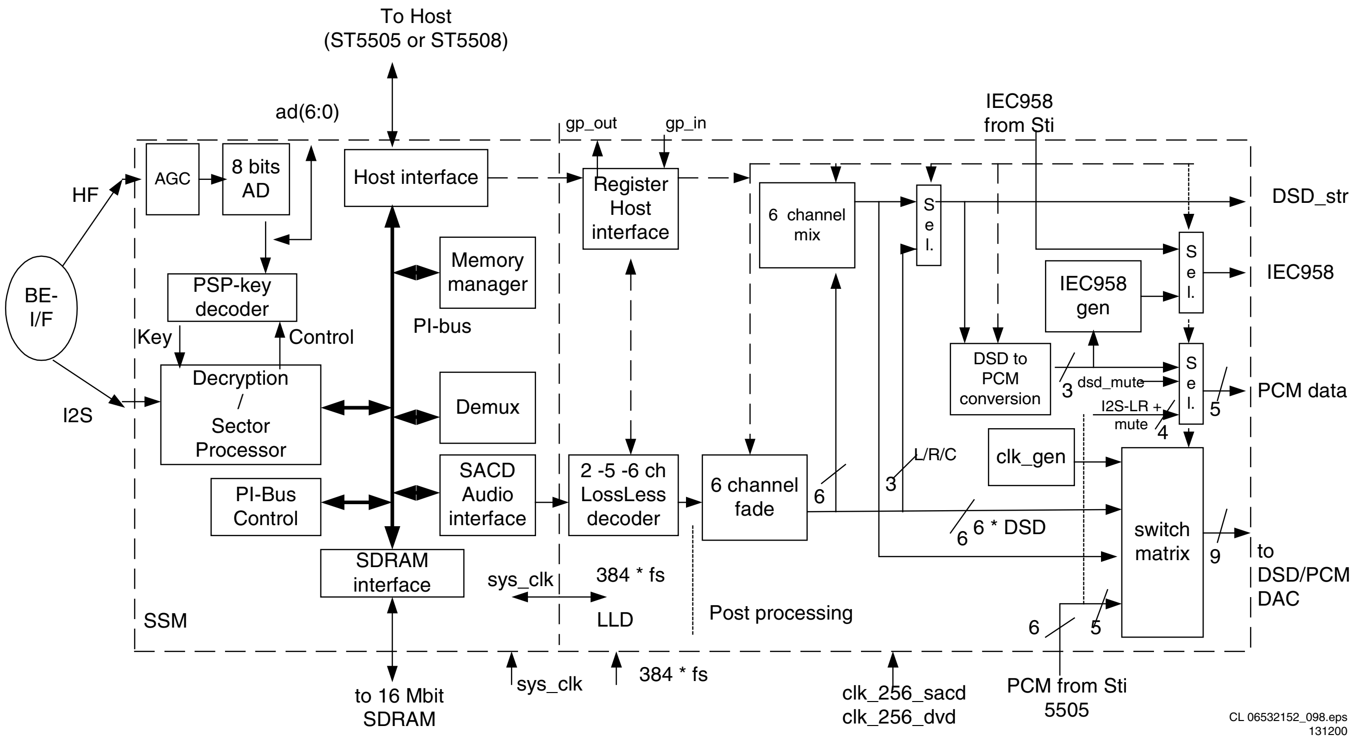


Figure 9-7

9.24.3 Basic Engine Interface

Data input interface.
The Basic Engine Interface is connected to the output of the SAA7335 (HD61)

Analogue HF input
The analogue HF input, coming from the optical pickup unit, is also fed to the Furore IC to extract the copyprotection information "PSP".

9.24.4 SDRAM Interface

The SDRAM interface forms a glueless interface to one 16Mbit or one 64 Mbit SDRAM device.
The interface takes care for the power-up sequence, mode programming and refreshing of the SDRAM devices. This is hard coded in the interface and doesn't have to be controlled by the host.

9.24.5 Audio data input/output Interface

DSD/PCM combined data output.
DSD_PCM : Output intended for a combined 6 channel DSD (SACD) and PCM (DVD-CDDA) DAC. Switching between the PCM data coming from the Sti5505 and the internal generated DSD signals is done in the Furore IC.

Stereo DSD only output.
DSD_stereo: 2 channel DSD output, with stereo down mix in the case of 5 and 6 channel and normal stereo in case of 2 channel DSD mode.

Stereo PCM data output.
Two possible stereo sources can be selected as stereo PCM output:
- Stereo PCM coming from the Sti5505 via the PCM input on Furore.
- Stereo or down mix PCM derived via a decimation filter from the SACD-DSD signal.

Digital audio output interface (IEC958)
The IEC958 format is intended to connect the SA12S1 to a digital receiver. No DSD signals are defined for IEC958 therefore the DSD-->PCM converted signal will be transmitted. Following two types of signals are possible on the digital interface:
- IEC958 data coming from Sti5505.
- IEC958 data, Stereo or down mix PCM, derived via a decimation filter from the SACD-DSD signal.

Clock + reset input.
Two different processing clocks are needed in the FURORE-IC:
- Sys_clk: System clock for data processing part, frequency can be 27 MHz or 768 * Fs.
- 384 * Fs: Processing clock for LLD and postprocessing.

RESETn is an asynchronous reset and should be low for at least 1 period of DSD_CLK.

General-purpose in/outputs.

Four general purpose input and output signals are available.

9.24.6 Pin description

IC-Pin_no	Name	Type	Function
1	H_DQ[13]	I/O5	Data bus
2	H_DQ[12]	I/O5	Data bus
3	VCC_IO	IN	3.3V power supply IO
4	GND_IO	IN	Ground
5	H_DQ[11]	I/O5	Data bus
6	H_DQ[10]	I/O5	Data bus
7	H_DQ[9]	I/O5	Data bus
8	H_DQ[8]	I/O5	Data bus
9	H_DQ[7]	I/O5	Data bus
10	H_DQ[6]	I/O5	Data bus
11	H_DQ[5]	I/O5	Data bus
12	H_DQ[4]	I/O5	Data bus
13	VCC_CORE	IN	3.3V power supply Core
14	GND_CORE	IN	Ground(core)
15	H_DQ[3]	I/O5	Data bus
16	H_DQ[2]	I/O5	Data bus
17	H_DQ[1]	I/O5	Data bus
18	H_DQ[0]	I/O5	Data bus
19	VCC_IO	IN	3.3V power supply IO
20	H_procclock	IN	Host processor EMI interface clock
21	GND_IO	IN	Ground
22	H_WAIT	O5	Wait signal
23	H_RWn	IN	READ=1,Write=0
24	H_CSLn	IN	Chip Select, active low
25	H_CSHn	IN	Chip select
26	H_ben(1)	IN	Byte Enable 1
27	H_ben(0)	IN	Byte Enable 0
28	B_V4	IN	Versatile Input Pin (contains Subcode), not used
29	B_SYNC	IN	Sector sync / Absolute time sync
30	B_FLAG	IN	I2S flag (EDC flag)
31	B_BCLK	IN	I2S Bit ClocK
32	B_WCLK	IN	I2S Word CLock
33	B_DATA	IN	I2S Data
34	GP_in_pin(0)	IN	General purpose in
35	GP_in_pin(1)	IN	General purpose in
36	AD[6]	I/O5	
37	AD[5]	I/O5	
38	AD[4]	I/O5	
39	VCC_CORE	IN	3.3V power supply Core
40	GND_CORE	IN	Ground(core)
41	AD[3]	I/O5	
42	AD[2]	I/O5	
43	AD[1]	I/O5	
44	AD[0]	I/O5	Digital out of AD OR digital in for PLL
45	GP_in_pin (2)	IN	General purpose in
46	biasin	APIO	Current input. connect via 15K to VSS
47	vddaagc	VDDCO	VDD of AGC (+ 3.3V)
48	Agcadctstp	APIO	AGC Positive channel test pin
49	vssaagc	VSSCO	Analog ground for AGC.
50	agcinp	APIO	AGC positive input signal, HF in.
51	VCC_IO	IN	3.3V power supply IO
52	GND_IO	In	Ground
53	agcadctstn	APIO	AGC Negative channel test pin
54	vssaadc	VSSCO	VSS of AGC & ADC connected to substrate
55	vddaadc	VDDCO	VDD of ADC (+3.3V)
56	adcrefh	APIO	ADC decoupling high . (via 100nF to VSS)
57	Adcrefm	APIO	ADC decoupling middle . (via 100nF to VSS)

IC-Pin_no	Name	Type	Function
58	adcrefl	APIO	ADC decoupling low. (via 100nF to VSS)
59	vssrefadc	VSSCO	VSS of Reference Ladder of ADC (not to the substrate)
60	PCM_LeRi_in	IN	PCM data Left/Right
61	PCM_CeLf_in	IN	PCM data Centre/LFE
62	PCM_LsRs_in	IN	PCM data lift/Right surround
63	PCM_wclk_in	IN	PCM word clock
64	PCM_dclk_in	IN	PCM data clock
65	VCC_CORE	IN	3.3V power supply Core
66	GND_CORE	IN	Ground(core)
67	GP_in_pin (3)	IN	General purpose in
68	D_ADDR[4]	O5	SDRAM Address bus
69	D_ADDR[5]	O5	SDRAM Address bus
70	GND_IO	IN	Ground
71	D_ADDR[6]	O5	SDRAM Address bus
72	D_ADDR[7]	O5	SDRAM Address bus
73	D_ADDR[8]	O5	SDRAM Address bus
74	D_ADDR[9]	O5	SDRAM Address bus
75	VCC_IO	IN	3.3V power supply IO
76	D_clk	O5	Clock signal needed for SDRAM.
77	GND_IO	IN	Ground
78	D_ADDR[0]	O5	SDRAM Address bus
79	D_ADDR[1]	O5	SDRAM Address bus
80	D_ADDR[2]	O5	SDRAM Address bus
81	D_ADDR[3]	O5	SDRAM Address bus
82	VCC_IO	IN	3.3V power supply IO
83	GND_IO	IN	Ground
84	D_ADDR[10]	O5	SDRAM Address bus
85	D_ADDR[11]	O5	SDRAM Address bus
86	GND_IO	-	Ground.
87	D_RASn	O5	Row Address Select
88	D_CASn	O5	Column Address Select
89	D_Wen	O5	Read/Write
90	D_LDQM	O5	DQ mask enable (lower)
91	VCC_CORE	IN	3.3V power supply Core
92	GND_CORE	IN	Ground(core)
93	D_UDQM	O5	DQ mask enable (Upper)
94	D_DQ[0]	I/O5	Data bus
95	VCC_IO	IN	3.3V power supply IO
96	D_DQ[1]	I/O5	Data bus
97	D_DQ[2]	I/O5	Data bus
98	D_DQ[3]	I/O5	Data bus
99	D_DQ[4]	I/O5	Data bus
100	VCC_IO	IN	3.3V power supply IO
101	GND_IO	IN	Ground
102	D_DQ[5]	I/O5	Data bus
103	D_DQ[6]	I/O5	Data bus
104	D_DQ[7]	I/O5	Data bus
105	D_DQ[8]	I/O5	Data bus
106	D_DQ[9]	I/O5	Data bus
107	D_DQ[10]	I/O5	Data bus
108	D_DQ[11]	I/O5	Data bus
109	D_DQ[12]	I/O5	Data bus
110	VCC_IO	IN	3.3V power supply IO
111	GND_IO	IN	Ground
112	D_DQ[13]	I/O5	Data bus
113	D_DQ[14]	I/O5	Data bus
114	D_DQ[15]	I/O5	Data bus
115	D_ADDR[12]	O5	SDRAM Address bus
116	D_ADDR[13]	O5	SDRAM Address bus
117	VCC_CORE	IN	3.3V power supply Core
118	GND_CORE	IN	Ground(core)

IC-Pin_no	Name	Type	Function
119	DSD_PCM_0	O10	DSD data output signal. On 64 * Fs Stereo : Left channel (channel 0) MCA5/6 : front left (channel 0) OR From PCM switch matrix
120	DSD_PCM_1	O10	Stereo : right channel (channel 1) MCA 5/6 : front right (channel 1) OR From PCM switch matrix
121	DSD_PCM_2	O10	Stereo : mute sequence MCA 5/6 : front centre (channel 2) OR From PCM switch matrix
122	DSD_PCM_3	O10	stereo : mute sequence MCA-5 : mute sequence MCA-6 : LFE channel. (channel 3) OR From PCM switch matrix
123	VCC_IO	IN	3.3V power supply IO
124	GND_IO	IN	Ground
125	DSD_PCM_4	O10	Stereo : mute sequence MCA-5 : left surround (channel 3) MCA-6 : left surround (channel 4) OR From PCM switch matrix
126	DSD_PCM_5	O10	Stereo : mute sequence MCA-5 : right surround (channel 4) MCA-6 : right surround (channel 5) OR From PCM switch matrix
127	DSD_PCM_6	O5	DSD clock signal. OR From PCM switch matrix
128	DSD_PCM_7	O5	DSD stereo or down mix Left OR From PCM switch matrix
129	DSD_PCM_8	O5	DSD stereo or down mix Right OR From PCM switch matrix
130	DSD_str(0)	O10	DSD stereo or downmix on DSD.
131	DSD_str(1)	O10	DSD stereo or downmix on DSD.
132	dsd_clk	O5	DSD clock for DSD stereo signal.
133	VCC_IO	IN	3.3V power supply IO
134	GND_IO	IN	Ground
135	PCM_LeRi_Out	O10	PCM data Left/Right to AV PCB
136	PCM_wclk_Out	O5	PCM word clock
137	fs_256_sacd	IN	256 * Fs audio clock generated for SACD (Fs=44.1k Hz)
138	mute_tot	O10	Selectable mute signal from PCM source or internal SACD source.
139	fs_256_dvd	IN	256 * Fs audio clock generated for DVD (Fs=48 kHz)
140	RESETn	IN	Asynchronous Reset
141	D_cke	O5	Clock enable output to SDRAM to enable the power down mode.
142	PCM_clk_Out	O5	256 * fs O10put./384 * Fs O10
143	VCC_CORE	IN	3.3V power supply Core
144	GND_CORE	IN	Ground(core)
145	PCM_mute_in	IN	PCM mute signal.
146	IEC958_in	IN	IEC958 input from Sti5505
147	IEC958_Out	O10	IEC958 O10put
148	VCC_IO	IN	3.3V power supply IO
149	CLK	IN	system Clock 27 MHz
150	GND_IO	IN	Ground
151	GP_out_pin (0)	O10	General purpose out
152	GP_out_pin (1)	O10	General purpose out
153	GP_out_pin (2)	O10	General purpose out
154	GP_out_pin (3)	O10	General purpose out
155	Prog_clk_sys	O10	Clock divide from system clock.
156	Prog_clk_384	O10	Clock divided from 384 * Fs LLD clock.
157	Pll_lock	O10	Indication that PLL is in lock
158	VCC_IO	IN	3.3V power supply IO
159	clk_384	IN	DSD system clock 384*Fs = 16.934400Hz
160	GND_IO	IN	Ground
161	Pll_sync	O10	Sector sync found.
162	Psp_enable	O10	If '1' PSP circuit is active
163	75hz_pulse	O10	75 Hz pulse to audio interface
164	Ssm_act	O10	Indication new frame is being transmitted
165	Lld_mute	O10	If '1' mute indication from audio interface
166	Play	O10	If '1' Fade circuit is in LLD mode
167	mute_det	O10	Mute 0x69 for all channels detection
168	Fade_busy	O10	Indication that fade in/out is busy
169	Do_grab	O10	Active data out of LLD.
170	VCC_CORE	IN	3.3V power supply Core

IC-Pin_no	Name	Type	Function
171	GND_CORE	IN	Ground(core)
172	PCM_dclk_Out	O5	PCM data clock
173	Tst(1)	IN	internal pull up for both test pins
174	Tst(0)	IN	IC testpins tst(1:0) 11 : Functional behaviour 10 : RAM test 01 : scan shift 00 : scan normal
175	TDI	IN	Boundary scan Data Input.
176	TMS	IN	Boundary scan Mode select
177	TCK	IN	Boundary scan Clock
178	TDO	O10	O10put
179	TRST	IN	Boundary scan Reset.
180	GND_IO	IN	Ground
181	H_IRQn	O5	Interrupt Request, active low
182	H_A22	IN	Data Strobe, active low
183	H_A[21]	IN	Address bus
184	H_A[20]	IN	Address bus
185	H_A[19]	IN	Address bus
186	H_A[18]	IN	Address bus
187	H_A[17]	IN	Address bus
188	H_A[16]	IN	Address bus
189	H_A[15]	IN	Address bus
190	H_A[14]	IN	Address bus
191	H_A[13]	IN	Address bus
192	H_A[12]	IN	Address bus
193	H_A[11]	IN	Address bus
194	H_A[10]	IN	Address bus
195	VCC_CORE	IN	3.3V power supply Core
196	GND_CORE	IN	Ground(core)
197	H_A[9]	IN	Address bus
198	H_A[8]	IN	Address bus
199	H_A[7]	IN	Address bus
200	H_A[6]	IN	Address bus
201	H_A[5]	IN	Address bus
202	H_A[4]	IN	Address bus
203	H_A[3]	IN	Address bus
204	H_A[2]	IN	Address bus
205	H_A[1]	IN	Address bus
206	VCC_IO	IN	3.3V power supply IO
207	H_DQ[15]	I/O5	Data bus
208	H_DQ[14]	I/O5	Data bus

9.25 Circuit description of DAC board

9.25.1 Description

The DAC board has 6 high performance audio outputs. It consists of 3 D/A converters and their appropriate filters, the clock generator part, the filter-control part and the muting-control part (See block diagram).
Key components are D/A converter CS4397 and I2C controller PCF8574.
The DAC board supports DSD and PCM. The digital data are sent from the MONO board to the DAC's QD41,QD51 and QD61 via a flex and connector JD01. The audio signals are sent to the cinches via a 2 or 1 filter stage. In these filter stages discrete opamp's are used.
The DAC board is I2C controlled via the I2C bus from the mono board to the DAC's and I2C controller QD21.
The differences between DSD mode and PCM mode are shown in the table below:
Digital audio data

Pin number	PCM mode	DSD mode
11	BCK	BCK
12	LRCK	SEL_DSD
13	SDT	DSD_L
14	SEL_PCM	DSD_R

MCLK

AUDIO SIGNAL	MCLK
DSD(SACD)	192Fs(8.4672 MHz)
PCM audio (Fs = 44.1 kHz) (CD)	384Fs(16.9344 MHz)
PCM audio (Fs = 32,4896 kHz)	256Fs

9.25.2 Filter setting

The user can select 3 filter settings using switch SD71 at the rear of the set. This is only effective during the playback of SACD discs. See the table below.

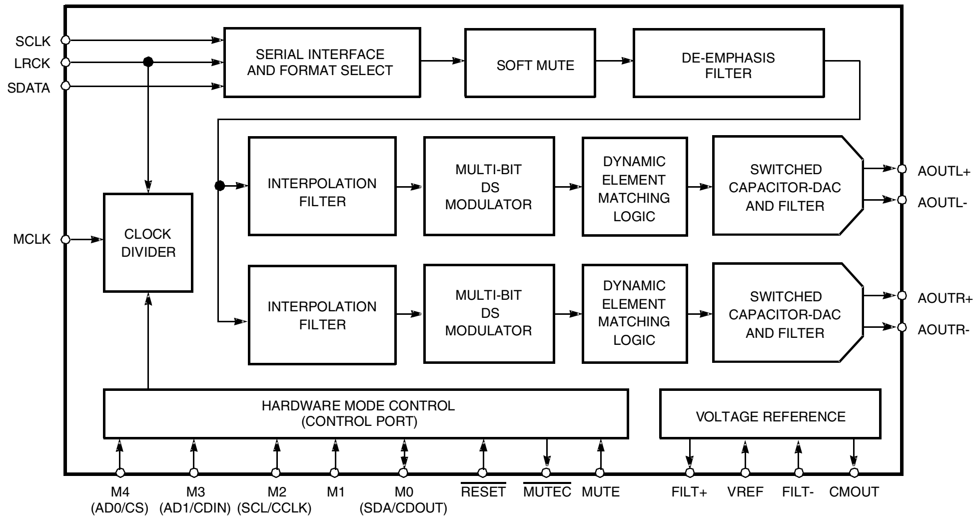
DISCS	Filter switch position		
	Position 1	position 2	position 3
SACD (DSD)	All channels: Normal*	L and R: Custom* Other channels: Normal	All channels: Custom
CD (PCM)	All channels : Custom		

* Normal: output via 1 filter stage (3rd order filter)
Custom: output via 2 filter stage (6th order filter)

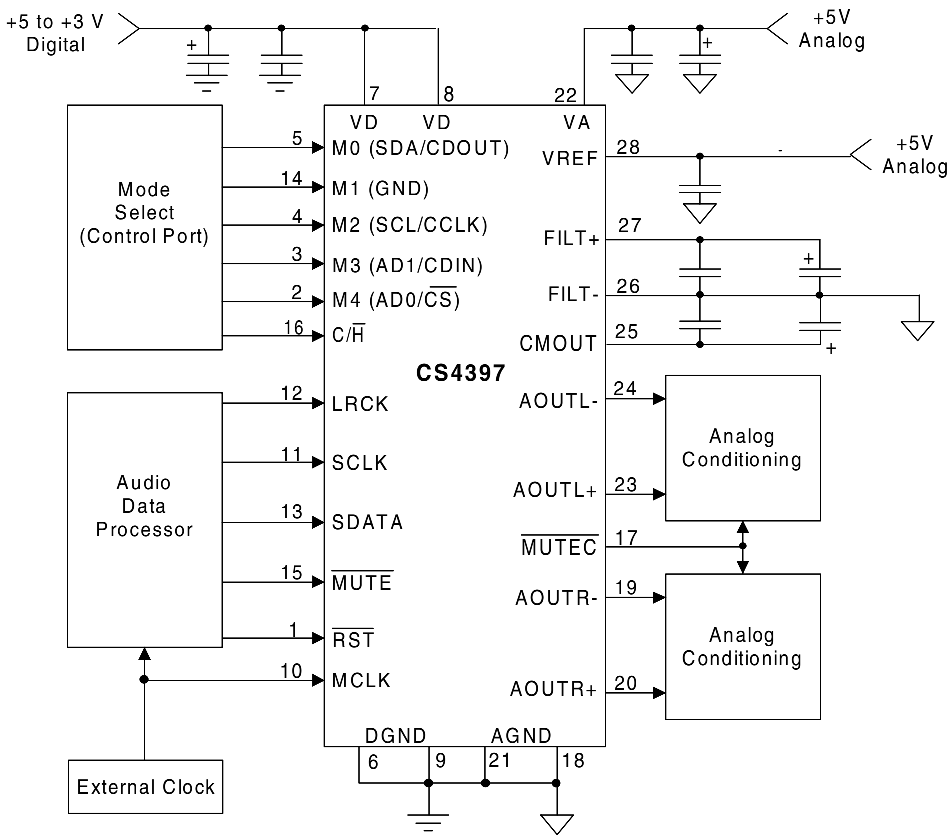
9.25.3 Description of DAC CS4397

CS4397

Block Diagram



Pin Configuration



Typical Connection Diagram - Hardware Mode (Control Port Mode)

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Pin Function

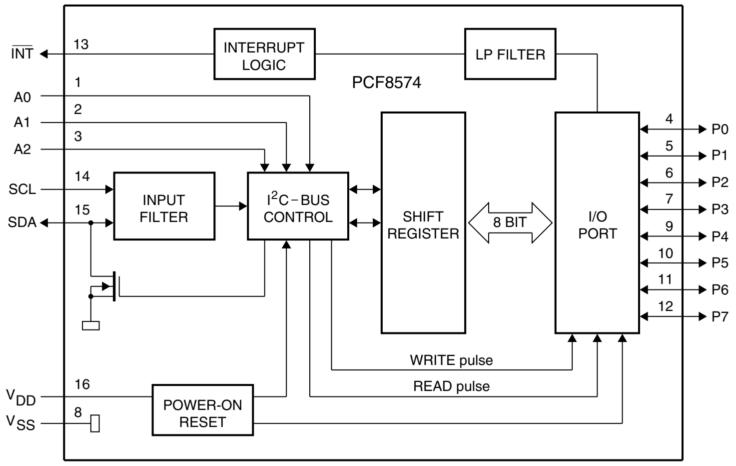
No.	Pin Name	I/O	Description
1	RST	I	Reset input (Low active)
2	M4(AD0/CS)	I	Chip address bit0 for I2C
3	M3(AD1/CDIN)	I	Chip address bit1 for I2C
4	M2(SCL/CCLK))	I	Serial clock for I2C
5	M0(SDA/CDOUT)	I/O	Serial data for I2C
6	DGND		Digital ground
7	VD		Digital power supply +3.3V
8	VD		Digital power supply +3.3V
9	DGND		Digital ground
10	MCLK	I	Master clock PCM mode:256Fs DSD mode:192Fs (8.4672MHz)
11	SCLK	I	Serial data clock
12	LRCK(PCM) CLKMODE(DSD)	I I	PCM mode:Left/Right channel clock DSD mode:Select MCLK to DSD data rate clock rations
13	SDATA(PCM) DSD_L(DSD)	I	PCM mode:Serial audio data DSD mode:Direct Stream Digital audio data (Left)
14	M1(PCM) DSD_R(DSD)	I	PCM mode:(Low) DSD mode:Direct Stream Digital audio data (Right)
15	MUTE	I	Mute input (Low active)
16	C/H	I	Control port (H) /Hardware (L) mode select
17	MUTEC	O	Mute control (Low active)
18	AGND		Analog ground
19	AOUTR-	O	Right channel negative Analog out
20	AOUTR+	O	Right channel positive Analog out
21	AND		Analog ground
22	VA		Analog power supply +5.5V
23	AOUTL+	O	Left channel positive Analog out
24	AOUTL-	O	Left channel negative Analog out
25	CMOUT	O	Common mode voltage
26	FILT-	I	Reference ground
27	FILT+	O	Reference filter
28	VREF		Voltage reference input

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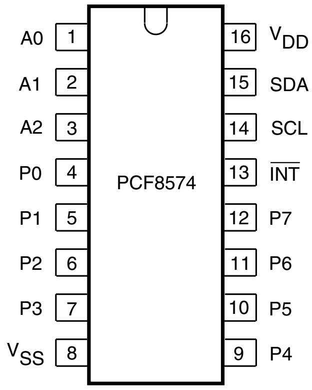
9.25.4 Description of I2C controller PC8574

PC8574

Block Diagram



Pin Configuration



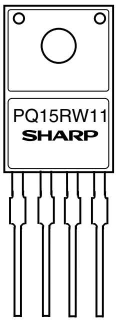
Pin Function

SYMBOL	PIN		DESCRIPTION
	DIP16; SO16	SSOP20	
A0	1	6	address input 0
A1	2	7	address input 1
A2	3	9	address input 2
P0	4	10	quasi-bidirectional I/O 0
P1	5	11	quasi-bidirectional I/O 1
P2	6	12	quasi-bidirectional I/O 2
P3	7	14	quasi-bidirectional I/O 3
V_{SS}	8	15	supply ground
P4	9	16	quasi-bidirectional I/O 4
P5	10	17	quasi-bidirectional I/O 5
P6	11	19	quasi-bidirectional I/O 6
P7	12	20	quasi-bidirectional I/O 7
$\overline{INT}$	13	1	interrupt output (active LOW)
SCL	14	2	serial clock line
SDA	15	4	serial data line
V_{DD}	16	5	supply voltage
n.c.	-	3	not connected
n.c.	-	8	not connected
n.c.	-	13	not connected
n.c.	-	18	not connected

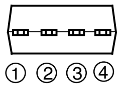
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9.26 IC description of Linear power supply

PQ15RW11

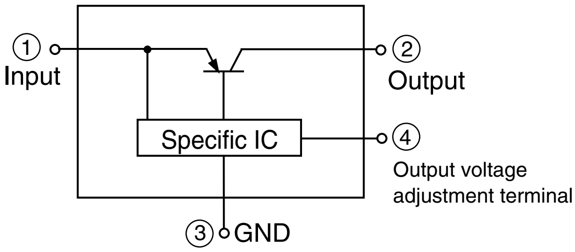


Pin Configuration

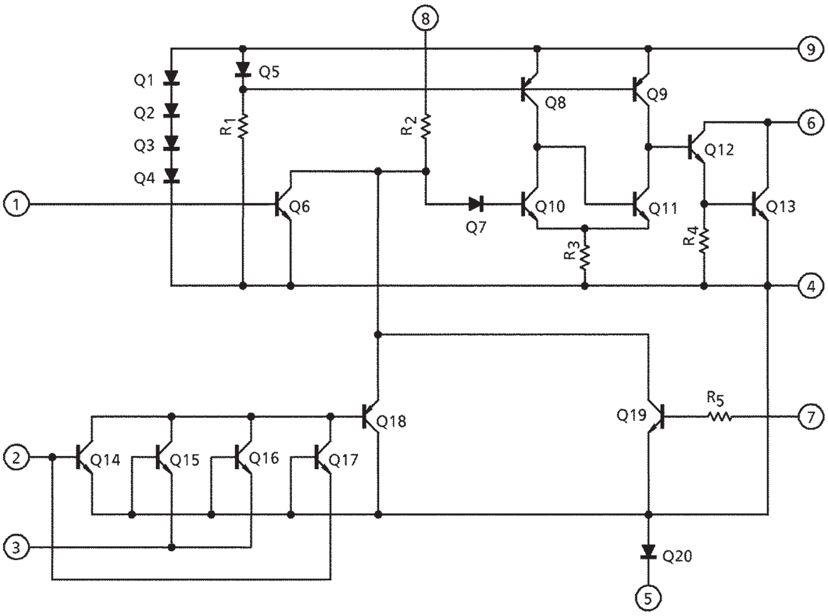


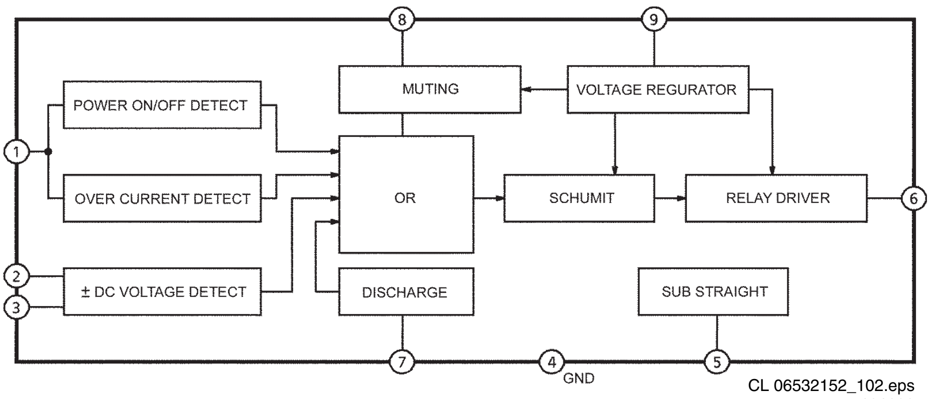
① DC input(Vin)
② DC output(Vo)
③ GND
④ Output voltage adjustment terminal(Vadj)

Block Diagram



TA7317P





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9.27 List of abbreviations

Abbreviation	Description
+12VSTBY	+12V power supply present during standby
+3A	Filtered 3V3 power supply to IC7207(MACE servo processor)
+3V3	3V3 power supply
+3V3S	Stabilised 3V3 power supply from IC7605 to MACE (IC7207) circuit
+5V	+5V power supply
+5VA	Filtered +5V: analog power supply for IC7311(HD61 decoder)
+5VB	Filtered +5V: digital power supply for IC7311(HD61 decoder)
+5VC	+5V power supply for IC7202(servo flash eprom)
+5VSTBY	+5V power supply present during standby
+5VX	+5V power supply for IC7105(opamp)
+6VSTBY	+6V power supply present during standby
+9V	Stabilised +9V power supply from IC7109 to IC7103 (Servo power driver)
0_6_12V	Scart switch control signal to A/V board. 0V : loop through (AUX to TV), 6V : play 16:9 format, 12V : play 4:3 format
1.5V	1.5V reference voltage for IC7102 (DVDALAS)
2.0V	2V reference voltage for IC7102 (DVDALAS)
2.5V	2.5V reference voltage for IC7102 (DVDALAS)
27M_CLK	27MHz clock out of the PLL-Master clock for the main processor (IC7503)
384FS_IN	SACD clock from DAC PCB
75HZ_PULSE	75Hz pulse to audio interface indication output
-8VSTBY	-8V power supply present during standby
A[20:1]	System address bus (EMI)
A1_MACE	Amplitude of the "land" reflection relative to the average EFM
AD[11:0]	SDRAM address bus
ALE	Address latch enable (servo processor)
ALPHA0	Generic name for the setpoint of the laser power absorption control
AM[7:0]	Latched low address bus to servo flash
AM[17:8]	High address bus to servo flash
AMD[7:0]	Multiplexed address data bus to servo flash
Ax	Central photodiode signal
B	Central photodiode signal
B_BCLK	Basic engine I2S bit clock
B_DATA	Basic engine I2S data
B_FLAG	Basic engine error flag
B_OUT	Video output blue from Sti5505
B_SYNC	Basic engine sector /abs time sync
B_V4	Basic engine versatile input pin
B_VID	Buffered video output Blue to A/V board
B_WCLK	Basic engine I2S word clock
BE1N_FUR	Upper byte enable of the Furore
BE0N_FUR	Lower byte enable of the Furore
C	Central photodiode signal
C_OUT	Chrominance output from Sti5505
C_VID	Buffered Chrominance output to A/V board
CALF_MACE	Central aperture low frequency control signal to MACE
CAS[1:0]ND	DRAM column address strobe
CASN	SDRAM column address strobe
CE_ROM1N	Chip enable flash eprom IC7401
CE_ROM2N	Chip enable flash eprom IC7451
CE_ROMN	Chip enable ROM memory (flash access)
CENTRE_ON	Control signal from Sti5505 to AV board to switch STEREO OUTPUT cinch to mono.
CFLG	Correction flag output
CFR	Control processor ready to accept data (S2B)
CLK	Clock for SDRAM memory
COSPH	Position Control Sledge in
CPUANALYSE	Control port P3 I/O from Sti5505
CPURESET	Control port P3 I/O to Sti5505
CSH_FUR	FURORE chip select the upper bank
CSI	Chip select input of HD61 (servo)
CSL_FUR	FURORE chip select the lower bank
CSN[2:1]	SDRAM chip select
CTS_SER	Clear to send control signal of service serial interface
CVBS	Buffered composite video output to A/V board
CVBS_OUT	Composite video output from Sti5505
D	Central photodiode signal
D[15:0]	System data bus (EMI)
DO_GRAB	Active data out of LLD (LossLess Decoder). Indication output
DQ[15:0]	SDRAM data bus
DQML	SDRAM data mask enable (Lower)
DQMU	SDRAM data mask enable (Upper)
DSD	Direct Stream Digital
DSD_CLK	DSD clock for DSD stereo signal
DSD_PCM[8:0]	DSD data
DSD_STR[1:0]	DSD stereo or downmix on DSD
DST	Direct Stream Transfer
DVD_LDN	Control signal from MACE to loader supply IC7107
E	Satellite photodiode signal
EMI_IRQN	Interrupt request, active low
ERROROUT	Control port P3 I/O from Sti5505
F	Satellite photodiode signal
FADE_BUSY	Indication that fade in/out is busy
FLASH_OEN	FLASH output enable control signal
FO	Focus actuator output
FOC-	Focus actuator negative connection
FOC+	Focus actuator positive connection
FUR_AD[13:0]	FURORE SDRAM address bus
FUR_CASN	Furore SDRAM column address strobe
FUR_CKE	Furore SDRAM clock enable
FUR_CLK	Furore SDRAM clock
FUR_DQ[15:0]	FURORE SDRAM data bus
FUR_DQMH	FURORE SDRAM data mask enable (Upper)
FUR_DQML	FURORE SDRAM data mask enable (Lower)
FUR_RASN	Furore SDRAM row address strobe
FUR_TDI	Boundary scan test data input FURORE
FUR_TMS	Boundary scan test mode select FURORE
FUR_TRST	Boundary scan test port reset FURORE
FUR_WEN	Furore SDRAM write enable
G_OUT	Video output green from Sti5505
G_VID	Buffered video output Green to A/V board
GND	Ground
GP_IN_PIN[3:0]	Furore general purpose input port
GP_OUT_PIN[3:0]	Furore general purpose output port

Signal	Description
HPSW	Control signal to swith HF signal path
HSYNC	Horizontal synchronization output
I2C_DAC	Control signal to enable/disable the I2C bus to the DAC PCB
INT	Interrupt request
KAR_BY_PASS	Karaoke bypass control signal from Sti5505 to AV board.
LD-CD	CD laser out
LD-DVD	DVD laser out
LLD_MUTE	LossLess Decoder Mute, if "1" mute indication from audio interface
LRCLK	PCM Left/Right clock (word clock) to AV board
LRCLK_AV	PCM Left/Right clock (word clock) to AV board
LRCLK_FUR	PCM Left/Right clock (word clock) to the FURORE
LRCLKO	PCM Left/Right clock (word clock) output from STI5505
MON1	CD laser monitor
MON2	DVD laser monitor
MOTO1	Motor control signal
MUTE	Mute control signal
MUTE_AV	Mute control signal to AV board
MUTE_DET	Mute detection, mute 0x69 for all channels detection
O[4:1]	Servo current outputs for focus control
O-CENTRAL	Testpin for offset cancelation
OEND	DRAM output enable
OSLINKIN	Control port P3 I/O to Sti5505
OSLINKOUT	Control port P3 I/O from Sti5505
OTD-HD61	Off track detection
P50	Bi-directional interface used for communication between video equipment
PCM_CELF_FUR	I2S center/subwoofer serial data line
PCM_CLK_FUR	Audio system clock to FURORE
PCM_CLK_ST	Audio system clock to STI5505
PCM_LERI_FUR	I2S left right data line to the FURORE
PCM_LSRS_FUR	I2S left/right surround serial data line
PCM_OUT0	I2S audio serial data out of the STI5505
PCMCLK_AV	I2S audio system clock to A/V PCB
PCMOUT_AV	I2S audio serial output data to A/V PCB
PLAY	If "1" Fade circuit is in LLD mode, indication output
PLL_LOCK	Indication that PLL is in lock
PLL_SYNC	Sector sync found indication
POR	Power on reset
PORN	Power on reset active low
PROG_CLK384	Clock divided from 384*Fs = 16.9344 Hz
PROG_CLKSYS	Clock divide from system clock
PSENn	Program strobe enable (Servo)
PSP	Pit Signal Processing
PSP_ENABLE	If "1" PSP circuit is active, indication output
PWR_FAIL	Power fail control signal from PSU
R_OUT	Video output Red from Sti5505
R_VID	Buffered video output Red to A/V board
RA	Radial actuator control signal from servo processor to power driver
RAC-SW	Radial control switch
RAD-	Radial actuator negative connection
RAD+	Radial actuator positive connection
RAMAD[14:0]	RAM memory address bus (Servo)
RAMDA[7:0]	RAM memory data bus (Servo)
RAMRW	RAM memory read/write control signal (Servo)
RAS[1:0]ND	DRAM row address strobe
RASN	SDRAM row address strobe
RDI	Read enable input of HD61
REFCOS	Position Control Sledge external cosine offset compensation/stepper motor cosine output
REFSIN	Position Control Sledge external sine offset compensation/stepper motor sine output
RESET_I2C	Reset I2C
Rfo	Amplified HF signal to HD61
RFP	Amplified HF signal for PSP recognition
RSTN	System reset
RTS_SER	Ready to send control signal of service serial interface
RWN	Read/Write control signal (EMI)
RXD_BE	Receive data of basic engine serial interface (S2B)
RXD_SER	Receive data of service serial interface
S[2:1]	Servo current outputs for radial tracking
SACD_CLK	SACD clock 16.394 MHz, CLK source of the system
SCART[1:0]	Scart control signals: slow blanking
SCL	I2C bus clock
SCL_DAC	I2C bus clock to DAC PCB
SCLK	PCM I2S serial bit clock
SCLK_AV	PCM I2S serial bit clock to A/V PCB
SCLK_FUR	PCM I2S serial bit clock to the FURORE
SCLKo	PCM I2S serial bit clock output from Sti5505
SDA	I2C bus data
SDA_DAC	I2C bus data to DAC PCB
SEL_ACLK1	Select audio clock 1
SEL_ACLK2	Select audio clock 2
SERVICE	Control signal of service serial interface
SICL	Serial interface clock input
SIDA	Serial interface data input
SILD	Serial interface load
SINPH	Position control sledge in
SL	Sledge actuator control signal from servo processor to power driver
SL-	Sledge actuator negative connection to sledge motor
SL+	Sledge actuator positive connection to sledge motor
SPDIF_AV	Digital audio to the A/V PCB
SPDIF_FUR	Digital audio to the FURORE
SPDIF_OUT	Digital output from STI5505
SSM_ACT	Indication new frame is being transmitted
ST_CLK	STI5505 system clock
ST_TDI	Boundary scan test data input to STI5505
STB_CONT	Standby control signal to power supply
STB_CONTD	Delayed standby control signal - enable or disable the clocks
STB_MUTE	Standby control signal mute
STB_OUT	Standby control signal to DAC PCB
STBY	Standby
SUR	Servo Unit Ready to accept data (S2B0
T[3:1]	Tacho control signals from HD61 to turntable motor driver
TCK	Boundary scan test clock
TDI	Boundary scan test data input
TDO	Boundary scan test data output
TMS	Boundary scan test mode select
TRAY1	Tray motor control signal 1 from servo processor to power driver

TRAY2	Tray motor control signal 2 from servo processor to power driver
TRAYSW	Tray switch control signal to servo processor
TRST	Boundary scan test port reset
TXD_BE	Transmitted data basic engine serial interface (S2B)
TXD_SER	Transmitted data service serial interface
VCC_FUR	Filtered power supply 3V3 to FURORE IC
VCC_LVC00	Filtered power supply 3V3 to IC7400
VCC3V3	Power supply 3V3
VCC5V	Power supply 5V to system clocks
VDD_DRAM	Power supply for DRAM 7450 (option)
VDD_MEM	Power supply for flashes 7401 and 7451
VDD_MEM2	Power supply for SDRAM
VDD_STI	Power supply for ST5505
VDDA_ADC	ADC power supply voltage 3V3 for FURORE
VDDA_AGC	AGC power supply voltage 3V3 for FURORE
VO2-	Tray motor negative connection
VO2+	Tray motor positive connection
V-REF	Reference voltage
VSYNC	Vertical synchronisation
-VVID	Negative reference voltage to video buffers
WAIT	Wait state request
WE	Servo flash Write Enable
WEN	Write enable control signal to SDRAM
WRI	Write enable input of HD61 (Servo)
Y_OUT	Luminance output from Sti5505
Y_VID	Buffered luminance output to A/V board

10. ELECTRICAL PARTS LIST

ASSIGNMENT OF COMMON PARTS CODES.

RESISTORS

R***: 1) GD05 ××× 140, Carbon film fixed resistor, ±5% 1/4W
R***: 2) GD05 ××× 160, Carbon film fixed resistor, ±5% 1/6W
① —— Resistance value

Examples ;
①Resistance value

0.1 Ω 001	10 Ω 100	1 kΩ 102	100 kΩ 104
0.5 Ω 005	18 Ω 180	2.7 kΩ 272	680 kΩ 684
1 Ω 010	100 Ω 101	10 kΩ 103	1 MΩ 105
6.8 Ω 068	390 Ω 391	22 kΩ 223	4.7 MΩ 475

Note : Please distinguish 1/4W from 1/6W by the shape of parts used actually.

CAPACITORS

C***: CERAMIC CAP.
3) DD1 ×××× 370, Ceramic capacitor
Disc type
Temp.coeff.P350 ～N1000, 50V
② ③
③ —— Capacity value
② —— Tolerance

Examples ;
② Tolerance (Capacity deviation)
±0.25 pF 0
±0.5 pF 1
±5% 5

∗ Tolerance of COMMON PARTS handled here are as follows :
0.5 pF～ 5 pF .... ±0.25 pF
6 pF～ 10 pF .... ±0.5 pF
12 pF～ 560 pF .... ±5%

③ Capacity value

0.5 pF 005	3 pF 030	100 pF 101
1 pF 010	10 pF 100	220 pF 221
1.5 pF 015	47 pF 470	560 pF 561

C*** : CERAMIC CAP.
4) DK16 ××× 300, High dielectric constant ceramic capacitor
Disc type
Temp.chara. 2B4, 50V
④ —— Capacity value

Examples ;
④ Capacity value

100 pF 101	1000 pF 102	10000 pF 103
470 pF 471	2200 pF 222	

C*** : 5) ELECTROLY CAP. ( ), 6) FILM CAP. ( )
5) EA ×××××× 10, Electrolytic capacitor
One-way lead type, Tolerance ±20%
⑤ ⑥
⑥ —— Working voltage
⑤ —— Capacity value

Examples ;
⑤ Capacity value

0.1 μF 104	4.7 μF 475	100 μF 107
0.33 μF 334	10 μF 106	330 μF 337
1 μF 105	22 μF 226	1100 μF 118
		2200 μF 228

⑥ Working voltage

6.3V 006	25V 025
10V 010	35V 035
16V 016	50V 050

6) DF15 ××× 350 → Plastic film capacitor
DF15 ××× 310 → One-way type, Mylar ±5% 50V
DF16 ××× 310 → Plastic film capacitor
One-way type, Mylar ±10% 50V
⑦ —— Capacity value

Examples ;
⑦ Capacity value

0.001 μF (1000 pF) 102	0.1 μF 104
0.0018 μF 182	0.56 μF 564
0.01 μF 103	1 μF 105
0.015 μF 153	

NOTE : 1) The above CODES (R*** , R*** , C*** , C*** and C***) are omitted on the schematic diagram in some case.
2) On the occasion, be confirmed the common parts on the parts list.
3) Refer to "Common Parts List" for the other common parts (**RI05**, **DD4**, **DK4**).

NOTE ON SAFETY FOR FUSIBLE RESISTOR :

The suppliers and their type numbers of fusible resistors are as follows;

1. KOA Corporation

Part No. (MJI)		Type No. (KOA)	Description
NH05 ××× 140	→	RF25S ×××× ΩJ	(±5% 1/4W)
NH05 ××× 120	→	RF50S ×××× ΩJ	(±5% 1/2W)
NH85 ××× 110	→	RF73B2A ×××× ΩJ	(±5% 1/10W)
NH95 ××× 140	→	RF73B2E ×××× ΩJ	(±5% 1/4W)

∗ Resistance value — Resistance value (0.1 Ω – 10 kΩ)

2. Matsushita Electronic Components Co., Ltd

Part No. (MJI)		Type No. (MEC)	Description
NF05 ××× 140	→	ERD-2FCJ ×××	(±5% 1/4W)
RF05 ××× 140			
NF02 ××× 140	→	ERD-2FCG ×××	(±2% 1/4W)
RF02 ××× 140			

∗Resistance value — ∗Resistance value

Examples ;
∗Resistance value

0.1 Ω 001	10 Ω 100	1 kΩ 102	100 kΩ 104
0.5 Ω 005	18 Ω 180	2.7 kΩ 272	680 kΩ 684
1 Ω 010	100 Ω 101	10 kΩ 103	1 MΩ 105
6.8 Ω 068	390 Ω 391	22 kΩ 223	4.7 MΩ 475

ABBREVIATION AND MARKS

ANT.	: ANTENNA	BATT.	: BATTERY
CAP.	: CAPACITOR	CER.	: CERAMIC
CONN.	: CONNECTING	DIG.	: DIGITAL
HP	: HEADPHONE	MIC.	: MICROPHONE
μ-PRO	: MICROPROCESSOR	REC.	: RECORDING
RES.	: RESISTOR	SPK	: SPEAKER
SW	: SWITCH	TRANSF.	: TRANSFORMER
TRIM.	: TRIMMING	TRS.	: TRANSISTOR
VAR.	: VARIABLE	X'TAL	: CRYSTAL

NOTE ON FUSE :

Regarding to all parts of parts code **FS20**xxx**2**xx, replace only with Wickmann-Werke GmbH, Type 372 non glass type fuse.

NOTE ON SAFETY :

Symbol ⚠ Fire or electrical shock hazard. Only original parts should be used to replaced any part marked with symbol ⚠ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

安全上の注意：

⚠がついている部品は、安全上重要な部品です。必ず指定されている部品番号の部品を使用して下さい。

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			MONO (PZ01)	
			CIRCUIT BOARD	
			MONO-CAPACITORS	
2009		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2010		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2011		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2012		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2013		4822 126 14043	1µF +80-20% Y5V 16V 0805	QP12614043
2100		2222 780 15656	330n16V 0805 X7R CER	QL78015656
2101		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2103		4822 124 80151	47µF 16V	QP12480151
2104		4822 126 13193	4.7nF 10% X7R 63V	QP12613193
2105		4822 122 33761	22pF 5%NP0 50V	QP12233761
2107		4822 126 13956	68pF 5% NP0 63V CASE 0603	QP12613956
2108		4822 126 14315	390pF 5% NP0 50V 0603	QP12614315
2109		2020 552 95697		QV55295697
2110		2222 861 15222	2n2 63V CER 0805 NP0 PM5	QL86115222
2111		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2112		5322 126 11578	1nF 10% X7R 50V 0603	QQ12611578
2113		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2114		4822 122 31765	100pF 2% NP0 63V	QP12231765
2115		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2116		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2117		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2118		3198 017 42230	22n 50V CER 0603 Y5VCOL	QG01742230
2119		3198 017 42230	22n 50V CER 0603 Y5VCOL	QG01742230
2120		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2121		4822 126 13879	220nF +80-20% 16V	QP12613879
2122		3198 017 42230	22n 50V CER 0603 Y5VCOL	QG01742230
2123		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2124		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2125		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2126		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2127		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2128		4822 126 14508	180pF 5% 50V 0603 NP0	QP12614508
2129		4822 126 14508	180pF 5% 50V 0603 NP0	QP12614508
2130		4822 122 33761	22pF 5%NP0 50V	QP12233761
2131		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2136		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2137		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2138		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2139		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2140		4822 126 14241	330p 50V 0603 NPO CER	QP12614241
2141		4822 122 33761	22pF 5%NP0 50V	QP12233761
2142		5322 126 11583	10nF 10% X7R 50V 0603 CER	QQ12611583
2143		4822 126 13883	220pF 5% 50V	QP12613883
2144		4822 126 13883	220pF 5% 50V	QP12613883
2145		4822 126 13883	220pF 5% 50V	QP12613883
2146		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2147		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2200		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2201		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2202		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2203		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2204		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2205		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2206		4822 126 14549	33N 16V X7R O6O3	QP12614549
2207		5322 126 11578	1nF 10% X7R 50V 0603	QQ12611578
2208		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2209		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2210		5322 126 11578	1nF 10% X7R 50V 0603	QQ12611578
2212		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2213		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2214		3198 017 42230	22n 50V CER 0603 Y5VCOL	QG01742230
2215		4822 124 23237	22µF 6.3V	QP12423237
2216		5322 126 11578	1nF 10% X7R 50V 0603	QQ12611578
2226		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2227		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2228		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2300		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2301		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2302		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2303		4822 124 80349	47µF 20% 6.3V	QP12480349
2304		3198 017 42230	22n 50V CER 0603 Y5VCOL	QG01742230
2305		3198 017 42230	22n 50V CER 0603 Y5VCOL	QG01742230
2306		4822 124 23002	10µF 16V	QP12423002
2307		3198 017 42230	22n 50V CER 0603 Y5VCOL	QG01742230
2308		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2309		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2310		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2314		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2315		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2316		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2317		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2318		5322 122 33861	120pF10% 50V	QQ12233861
2319		4822 126 11669	27pF	QP12611669
2320		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2401		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2402		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2403		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2404		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2405		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2406		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2407		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2408		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2409		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2410		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2411		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2412		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2413		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2414		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2418		4822 124 12095	100µF 20% 16V	QP12412095
2419		4822 124 80349	47µF 20% 6.3V	QP12480349
2420		4822 124 80349	47µF 20% 6.3V	QP12480349
2452		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2454		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2455		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2457		4822 124 23002	10µF 16V	QP12423002
2458		4822 126 14583	470nF 10% 16V XTR 0805	QP12614583
2459		4822 126 14043	1µF +80-20% Y5V 16V 0805	QP12614043
2500		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2504		4822 122 31765	100pF 2%NP0 63V	QP12231765
2505		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2506		4822 124 23002	10µF 16V	QP12423002
2507		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2508		5322 126 11579	3,3nF 10%X7R 63V	QQ12611579
2509		4822 126 14241	330p 50V 0603 NPO CER	QP12614241
2510		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2511		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2512		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2513		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2514		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2515		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2516		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2517		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2518		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2519		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2520		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2521		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2522		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2523		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2524		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2525		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2526		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2528		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2529		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2530		3198 030 74780	4µ7 35V ELCAP SMPM20	QG03074780
2531		3198 030 74780	4µ7 35V ELCAP SMPM20	QG03074780
2532		4822 122 33777	47pF 5%NP0 63V	QP12233777
2533		4822 122 33777	47pF 5%NP0 63V	QP12233777

NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			MONO-CAPACITORS	
2534		5322 126 11578	1nF 10% X7R 50V 0603	QQ12611578
2535		5322 126 11578	1nF 10% X7R 50V 0603	QQ12611578
2600		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2601		4822 126 14247	1n5 50V 0603 X7R COL R CER	QP12614247
2602		4822 126 14247	1n5 50V 0603 X7R COL R CER	QP12614247
2603		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2604		4822 124 12095	100µF 20% 16V	QP12412095
2605		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2606		4822 124 12095	100µF 20% 16V	QP12412095
2607		4822 124 12095	100µF 20% 16V	QP12412095
2608		4822 124 23002	10µF 16V	QP12423002
2609		4822 124 80151	47µF 16V	QP12480151
2610		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2611		4822 124 12095	100µF 20% 16V	QP12412095
2614		4822 122 33777	47pF 5%NP0 63V	QP12233777
2615		4822 122 33777	47pF 5%NP0 63V	QP12233777
2616		4822 122 33777	47pF 5%NP0 63V	QP12233777
2617		4822 122 33777	47pF 5%NP0 63V	QP12233777
2620		4822 122 33777	47pF 5%NP0 63V	QP12233777
2621		4822 122 33777	47pF 5%NP0 63V	QP12233777
2622		4822 122 33777	47pF 5%NP0 63V	QP12233777
2623		4822 122 33777	47pF 5%NP0 63V	QP12233777
2624		4822 122 33777	47pF 5%NP0 63V	QP12233777
2625		4822 122 33777	47pF 5%NP0 63V	QP12233777
2626		4822 122 33777	47pF 5%NP0 63V	QP12233777
2627		4822 122 33777	47pF 5%NP0 63V	QP12233777
2632		4822 124 12095	100µF 20% 16V	QP12412095
2633		4822 124 12095	100µF 20% 16V	QP12412095
2634		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2635		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2636		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2637		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2638		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2639		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2646		4822 124 23002	10µF 16V	QP12423002
2647		4822 122 33777	47pF 5%NP0 63V	QP12233777
2648		4822 122 33761	22pF 5%NP0 50V	QP12233761
2649		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2650		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2700		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2701		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2702		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2703		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2704		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2705		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2706		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2707		4822 124 80349	47µF 20% 6.3V	QP12480349
2800		4822 124 23002	10µF 16V	QP12423002
2801		4822 124 23002	10µF 16V	QP12423002
2802		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2803		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2804		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2805		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2806		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2807		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2808		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2809		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2810		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2811		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2812		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2813		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2814		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2815		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2816		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2817		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2818		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2819		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2820		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2821		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2822		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2823		4822 124 23002	10µF 16V	QP12423002
2824		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2825		4822 124 23002	10µF 16V	QP12423002
2826		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2827		5322 126 11583	10nF 10% X7R 50V 0603 CER	QQ12611583
2829		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2830		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2831		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2832		4822 126 14238	2n2 50V 0603 X7R COL R CER	QP12614238
2833		5322 126 11583	10nF 10% X7R 50V 0603 CER	QQ12611583
2901		5322 126 11583	10nF 10% X7R 50V 0603 CER	QQ12611583
2902		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2903		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2905		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2910		4822 124 12397	330µF 20% 6.3V	QP12412397
			MONO-RESISTORS	
3000		4822 051 30339	33R00 5% 0.062W	QP05130339
3001		4822 051 30339	33R00 5% 0.062W	QP05130339
3002		4822 051 30339	33R00 5% 0.062W	QP05130339
3003		4822 051 30103	10k00 5% 0.062W	QP05130103
3004		4822 051 30339	33R00 5% 0.062W	QP05130339
3005		4822 051 30339	33R00 5% 0.062W	QP05130339
3006		4822 051 30339	33R00 5% 0.062W	QP05130339
3007		4822 051 30339	33R00 5% 0.062W	QP05130339
3008		4822 051 30339	33R00 5% 0.062W	QP05130339
3009		4822 051 30339	33R00 5% 0.062W	QP05130339
3010		4822 117 12925	47k 1% 0.063W 0603	QP11712925
3011		4822 051 30339	33R00 5% 0.062W	QP05130339
3012		4822 051 30472	4k70 5% 0.062W	QP05130472
3013		4822 051 30103	10k00 5% 0.062W	QP05130103
3014		4822 051 30103	10k00 5% 0.062W	QP05130103
3015		4822 051 30103	10k00 5% 0.062W	QP05130103
3016		4822 051 30103	10k00 5% 0.062W	QP05130103
3017		4822 051 30103	10k00 5% 0.062W	QP05130103
3018		4822 117 12925	47k 1% 0.063W 0603	QP11712925
3019		4822 051 30103	10k00 5% 0.062W	QP05130103
3020		4822 051 30339	33R00 5% 0.062W	QP05130339
3021		4822 051 30472	4k70 5% 0.062W	QP05130472
3025		4822 051 30103	10k00 5% 0.062W	QP05130103
3026		4822 051 30103	10k00 5% 0.062W	QP05130103
3027		4822 051 30103	10k00 5% 0.062W	QP05130103
3028		4822 051 30103	10k00 5% 0.062W	QP05130103
3029		4822 051 30472	4k70 5% 0.062W	QP05130472
3030		4822 051 30103	10k00 5% 0.062W	QP05130103
3031		4822 051 30103	10k00 5% 0.062W	QP05130103
3033		4822 051 30102	1k00 5% 0.062W	QP05130102
3100		4822 117 11152	4R7 5%	QP11711152
3102		5322 117 13034	1k5 1% 0.063W 0603 RC22H	QQ11713034
3103		5322 117 13034	1k5 1% 0.063W 0603 RC22H	QQ11713034
3104		5322 117 13062	390R 1% 0.063W 0603 RC22H	QQ11713062
3105		4822 051 30103	10k00 5% 0.062W	QP05130103
3106		4822 051 30479	47R00 5% 0.062W	QP05130479
3107		4822 051 20228	2R20 5% 0.1W	QP05120228
3108		4822 051 20228	2R20 5% 0.1W	QP05120228
3109		4822 117 13632	100k 1% 0603 0.62W	QP11713632
3110		4822 051 30479	47R00 5% 0.062W	QP05130479
3111		5322 117 13058	150R 1% 0.063W 0603 RC22H	QQ11713058
3112		5322 117 13021	47R 1% 0.063W 0603 RC22H	QQ11713021
3114		4822 051 20228	2R20 5% 0.1W	QP05120228
3115		4822 051 20228	2R20 5% 0.1W	QP05120228
3116		5322 117 13042	3k9 1% 0.063W 0603 RC22H	QQ11713042
3117		4822 051 30181	180R00 5% 0.062W	QP05130181
3118		4822 051 30681	680R00 5% 0.062W	QP05130681
3119		5322 117 13062	390R 1% 0.063W 0603 RC22H	QQ11713062
3120		4822 051 30102	1k00 5% 0.062W	QP05130102
3121		4822 051 30273	27k00 5% 0.062W	QP05130273
3122		4822 051 30471	470R00 5% 0.062W	QP05130471
3123		4822 051 30103	10k00 5% 0.062W	QP05130103

NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			MONO-RESISTORS	
3124		4822 051 30471	470R00 5% 0.062W	QP05130471
3125		4822 051 30103	10k00 5% 0.062W	QP05130103
3126		4822 051 30103	10k00 5% 0.062W	QP05130103
3127		4822 051 30223	22k00 5% 0.062W	QP05130223
3128		2322 704 69109		QH70469109
3129		4822 051 30392	3k9 5% 0.063W 0603	QP05130392
3130		4822 051 20228	2R20 5% 0.1W	QP05120228
3131		4822 051 20228	2R20 5% 0.1W	QP05120228
3132		4822 051 20228	2R20 5% 0.1W	QP05120228
3133		4822 051 20228	2R20 5% 0.1W	QP05120228
3134		5322 117 13047	330R 1% 0.063W 0603 RC22H	QQ11713047
3135		4822 117 13613	2R2 5% 0603	QP11713613
3137		4822 117 13613	2R2 5% 0603	QP11713613
3138		5322 117 13053	6k8 1% 0.063W 0603 RC22H	QQ11713053
3139		4822 117 12917	1R 5% 0.062W CASE0603	QP11712917
3140		4822 051 30479	47R00 5% 0.062W	QP05130479
3141		4822 117 11152	4R7 5%	QP11711152
3142		5322 117 13028	12k 1% 0.063W 0603 RC22H	QQ11713028
3143		5322 117 13043	220R 1% 0.063W 0603 RC22H	QQ11713043
3144		2322 704 69109		QH70469109
3146		4822 051 30103	10k00 5% 0.062W	QP05130103
3147		4822 051 30103	10k00 5% 0.062W	QP05130103
3148		5322 117 13022	22k 1% 0.063W 0603 RC22H	QQ11713022
3153		4822 117 12139	22R 5% 0.062W	QP11712139
3155		4822 051 30103	10k00 5% 0.062W	QP05130103
3157		4822 051 30103	10k00 5% 0.062W	QP05130103
3158		5322 117 13017	100R 1% 0.063W 0603 RC22H	QQ11713017
3160		4822 051 30101	100R00 5% 0.062W	QP05130101
3161		4822 117 13613	2R2 5% 0603	QP11713613
3162		4822 051 30101	100R00 5% 0.062W	QP05130101
3163		4822 051 30273	27k00 5% 0.062W	QP05130273
3164		4822 117 13613	2R2 5% 0603	QP11713613
3165		5322 117 13063	120R 1% 0.063W 0603 RC22H	QQ11713063
3166		4822 051 30393	39k00 5% 0.062W	QP05130393
3167		4822 051 30101	100R00 5% 0.062W	QP05130101
3168		5322 117 13047	330R 1% 0.063W 0603 RC22H	QQ11713047
3169		4822 051 30101	100R00 5% 0.062W	QP05130101
3170		4822 051 30101	100R00 5% 0.062W	QP05130101
3171		4822 051 30101	100R00 5% 0.062W	QP05130101
3172		4822 117 13632	100k 1% 0603 0.62W	QP11713632
3173		4822 117 13632	100k 1% 0603 0.62W	QP11713632
3174		4822 117 11152	4R7 5%	QP11711152
3175		4822 117 13613	2R2 5% 0603	QP11713613
3176		4822 051 30153	15K00 5% 0.062W	QP05130153
3178		4822 117 11151	1R 5%	QP11711151
3179		4822 051 30221	220R00 5% 0.062W	QP05130221
3180		4822 117 13632	100k 1% 0603 0.62W	QP11713632
3181		4822 051 30561	560R00 5% 0.062W	QP05130561
3182		5322 117 13018	1k0 1% 0.063W 0603 RC22H	QQ11713018
3183		5322 117 13017	100R 1% 0.063W 0603 RC22H	QQ11713017
3184		2322 704 61204		QH70461204
3185		4822 117 11151	1R 5%	QP11711151
3187		4822 051 30273	27k00 5% 0.062W	QP05130273
3189		4822 051 30008	0R00 JUMPER	QP05130008
3190		4822 051 30008	0R00 JUMPER	QP05130008
3191		4822 051 30008	0R00 JUMPER	QP05130008
3192		4822 051 30008	0R00 JUMPER	QP05130008
3193		4822 051 30008	0R00 JUMPER	QP05130008
3194		4822 051 30008	0R00 JUMPER	QP05130008
3195		4822 051 30008	0R00 JUMPER	QP05130008
3197		4822 051 30008	0R00 JUMPER	QP05130008
3198		5322 117 13049	470R 1% 0.063W 0603 RC22H	QQ11713049
3199		5322 117 13042	3k9 1% 0.063W 0603 RC22H	QQ11713042
3200		4822 051 30103	10k00 5% 0.062W	QP05130103
3201		4822 117 11151	1R 5%	QP11711151
3202		4822 117 11151	1R 5%	QP11711151
3203		4822 051 30105	1M00 5% 0.062W	QP05130105
3204		4822 051 30331	330R00 5% 0.062W	QP05130331
3205		4822 051 30103	10k00 5% 0.062W	QP05130103
3206		4822 051 30103	10k00 5% 0.062W	QP05130103
3207		4822 051 30472	4k70 5% 0.062W	QP05130472
3208		4822 051 30272	2k70 5% 0.062W	QP05130272
3209		4822 051 30472	4k70 5% 0.062W	QP05130472
3210		4822 051 30392	3k9 5% 0.063W 0603	QP05130392
3211		4822 051 30472	4k70 5% 0.062W	QP05130472
3212		4822 117 11152	4R7 5%	QP11711152
3213		4822 117 11152	4R7 5%	QP11711152
3214		4822 051 30392	3k9 5% 0.063W 0603	QP05130392
3215		4822 051 30103	10k00 5% 0.062W	QP05130103
3216		4822 051 30472	4k70 5% 0.062W	QP05130472
3219		4822 051 30103	10k00 5% 0.062W	QP05130103
3220		4822 051 30103	10k00 5% 0.062W	QP05130103
3221		4822 051 30103	10k00 5% 0.062W	QP05130103
3224		4822 051 30151	150R00 5% 0.062W	QP05130151
3225		2322 704 62004		QH70462004
3226		4822 051 30103	10k00 5% 0.062W	QP05130103
3227		4822 051 30472	4k70 5% 0.062W	QP05130472
3229		4822 051 30123	12k00 5% 0.062W	QP05130123
3230		4822 051 30103	10k00 5% 0.062W	QP05130103
3231		4822 051 30103	10k00 5% 0.062W	QP05130103
3232		4822 117 13613	2R2 5% 0603	QP11713613
3233		4822 051 30102	1k00 5% 0.062W	QP05130102
3234		4822 117 12902	8K2 1% 0.063W 0603	QP11712902
3235		4822 117 13632	100k 1% 0603 0.62W	QP11713632
3236		4822 051 30472	4k70 5% 0.062W	QP05130472
3237		4822 051 30103	10k00 5% 0.062W	QP05130103
3238		4822 051 30103	10k00 5% 0.062W	QP05130103
3239		4822 051 30008	0R00 JUMPER	QP05130008
3240		4822 051 30103	10k00 5% 0.062W	QP05130103
3242		4822 051 30008	0R00 JUMPER	QP05130008
3243		4822 051 30008	0R00 JUMPER	QP05130008
3246		4822 051 30008	0R00 JUMPER	QP05130008
3247		4822 051 30008	0R00 JUMPER	QP05130008
3249		4822 051 30008	0R00 JUMPER	QP05130008
3250		4822 051 30008	0R00 JUMPER	QP05130008
3251		4822 051 30008	0R00 JUMPER	QP05130008
3252		4822 051 30008	0R00 JUMPER	QP05130008
3253		4822 051 30008	0R00 JUMPER	QP05130008
3254		4822 051 30008	0R00 JUMPER	QP05130008
3255		4822 051 30008	0R00 JUMPER	QP05130008
3256		4822 051 30008	0R00 JUMPER	QP05130008
3257		4822 051 30008	0R00 JUMPER	QP05130008
3258		4822 051 30008	0R00 JUMPER	QP05130008
3259		4822 117 11151	1R 5%	QP11711151
3260		4822 117 11151	1R 5%	QP11711151
3300		4822 117 11152	4R7 5%	QP11711152
3301		4822 051 30105	1M00 5% 0.062W	QP05130105
3302		4822 051 30221	220R00 5% 0.062W	QP05130221
3303		4822 051 30101	100R00 5% 0.062W	QP05130101
3304		4822 051 30272	2k70 5% 0.062W	QP05130272
3305		4822 051 30272	2k70 5% 0.062W	QP05130272
3306		4822 051 30101	100R00 5% 0.062W	QP05130101
3309		4822 051 30103	10k00 5% 0.062W	QP05130103
3310		4822 051 30223	22k00 5% 0.062W	QP05130223
3311		4822 051 30223	22k00 5% 0.062W	QP05130223
3312		4822 051 30472	4k70 5% 0.062W	QP05130472
3313		4822 051 30472	4k70 5% 0.062W	QP05130472
3316		4822 051 20108	1R00 5% 0.1W	QP05120108
3317		4822 051 20108	1R00 5% 0.1W	QP05120108
3318		4822 051 30472	4k70 5% 0.062W	QP05130472
3319		4822 051 30479	47R00 5% 0.062W	QP05130479
3320		4822 051 30472	4k70 5% 0.062W	QP05130472
3321		4822 051 30682	6k80 5% 0.062W	QP05130682
3322		5322 117 13026	4k7 1% 0.063W 0603 RC22H	QQ11713026
3323		5322 117 13026	4k7 1% 0.063W 0603 RC22H	QQ11713026
3324		4822 117 13632	100k 1% 0603 0.62W	QP11713632
3325		4822 051 30682	6k80 5% 0.062W	QP05130682
3326		4822 051 30479	47R00 5% 0.062W	QP05130479
3327		4822 051 30682	6k80 5% 0.062W	QP05130682

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			MONO-RESISTORS	
3328		4822 051 30223	22k00 5% 0.062W	QP05130223
3329		4822 051 30223	22k00 5% 0.062W	QP05130223
3330		4822 051 30223	22k00 5% 0.062W	QP05130223
3331		4822 051 30332	3k30 5% 0.062W	QP05130332
3332		4822 051 30332	3k30 5% 0.062W	QP05130332
3333		4822 051 30101	100R00 5% 0.062W	QP05130101
3334		4822 051 30101	100R00 5% 0.062W	QP05130101
3335		4822 051 30101	100R00 5% 0.062W	QP05130101
3336		4822 051 30339	33R00 5% 0.062W	QP05130339
3337		4822 051 30339	33R00 5% 0.062W	QP05130339
3338		4822 051 30101	100R00 5% 0.062W	QP05130101
3339		4822 051 30008	0R00 JUMPER	QP05130008
3340		4822 051 30008	0R00 JUMPER	QP05130008
3403		4822 051 30103	10k00 5% 0.062W	QP05130103
3404		4822 051 30103	10k00 5% 0.062W	QP05130103
3450		4822 051 30103	10k00 5% 0.062W	QP05130103
3451		4822 117 13632	100k 1% 0603 0.62W	QP11713632
3452		4822 051 30223	22k00 5% 0.062W	QP05130223
3453		4822 051 30222	2k20 5% 0.062W	QP05130222
3454		4822 051 30223	22k00 5% 0.062W	QP05130223
3455		4822 051 30223	22k00 5% 0.062W	QP05130223
3456		4822 051 30103	10k00 5% 0.062W	QP05130103
3457		4822 051 30103	10k00 5% 0.062W	QP05130103
3458		4822 051 30223	22k00 5% 0.062W	QP05130223
3459		4822 051 30223	22k00 5% 0.062W	QP05130223
3460		4822 051 30472	4k70 5% 0.062W	QP05130472
3462		4822 051 30101	100R00 5% 0.062W	QP05130101
3500		4822 051 30332	3k30 5% 0.062W	QP05130332
3501		4822 051 30332	3k30 5% 0.062W	QP05130332
3502		4822 051 30103	10k00 5% 0.062W	QP05130103
3503		4822 051 30103	10k00 5% 0.062W	QP05130103
3504		4822 051 30103	10k00 5% 0.062W	QP05130103
3505		4822 051 30103	10k00 5% 0.062W	QP05130103
3506		4822 051 30103	10k00 5% 0.062W	QP05130103
3508		4822 051 30689	68R 5% 0.063W 0603 RC21	QP05130689
3509		4822 051 30103	10k00 5% 0.062W	QP05130103
3511		4822 051 30332	3k30 5% 0.062W	QP05130332
3512		4822 051 30332	3k30 5% 0.062W	QP05130332
3513		4822 051 30103	10k00 5% 0.062W	QP05130103
3514		4822 051 30103	10k00 5% 0.062W	QP05130103
3515		4822 051 30103	10k00 5% 0.062W	QP05130103
3516		4822 051 30103	10k00 5% 0.062W	QP05130103
3517		4822 051 30332	3k30 5% 0.062W	QP05130332
3519		4822 051 30103	10k00 5% 0.062W	QP05130103
3520		4822 051 30103	10k00 5% 0.062W	QP05130103
3521		4822 051 30103	10k00 5% 0.062W	QP05130103
3522		4822 051 30103	10k00 5% 0.062W	QP05130103
3523		4822 051 30332	3k30 5% 0.062W	QP05130332
3524		4822 051 30101	100R00 5% 0.062W	QP05130101
3525		4822 051 30103	10k00 5% 0.062W	QP05130103
3526		4822 051 30103	10k00 5% 0.062W	QP05130103
3534		4822 051 30103	10k00 5% 0.062W	QP05130103
3535		4822 051 30153	15K00 5% 0.062W	QP05130153
3537		4822 051 30331	330R00 5% 0.062W	QP05130331
3538		4822 051 30681	680R00 5% 0.062W	QP05130681
3541		4822 051 30479	47R00 5% 0.062W	QP05130479
3542		4822 051 30479	47R00 5% 0.062W	QP05130479
3545		4822 051 30221	220R00 5% 0.062W	QP05130221
3546		4822 051 30101	100R00 5% 0.062W	QP05130101
3548		4822 051 30008	0R00 JUMPER	QP05130008
3550		4822 051 30101	100R00 5% 0.062W	QP05130101
3551		4822 051 30101	100R00 5% 0.062W	QP05130101
3564		4822 051 30008	0R00 JUMPER	QP05130008
3570		4822 051 30101	100R00 5% 0.062W	QP05130101
3571		4822 051 30689	68R 5% 0.063W 0603 RC21	QP05130689
3572		4822 051 30689	68R 5% 0.063W 0603 RC21	QP05130689
3606		4822 117 12925	47k 1% 0.063W 0603	QP11712925
3607		4822 117 13632	100k 1% 0603 0.62W	QP11713632
3608		4822 117 13632	100k 1% 0603 0.62W	QP11713632
3609		4822 117 13632	100k 1% 0603 0.62W	QP11713632
3610		4822 051 30103	10k00 5% 0.062W	QP05130103
3611		4822 051 30103	10k00 5% 0.062W	QP05130103
3612		4822 051 30103	10k00 5% 0.062W	QP05130103
3613		4822 051 30103	10k00 5% 0.062W	QP05130103
3614		4822 051 30103	10k00 5% 0.062W	QP05130103
3615		4822 051 30103	10k00 5% 0.062W	QP05130103
3616		4822 051 30103	10k00 5% 0.062W	QP05130103
3618		4822 051 30223	22k00 5% 0.062W	QP05130223
3619		4822 051 30223	22k00 5% 0.062W	QP05130223
3620		4822 051 30101	100R00 5% 0.062W	QP05130101
3621		4822 051 30101	100R00 5% 0.062W	QP05130101
3622		4822 051 30101	100R00 5% 0.062W	QP05130101
3623		4822 051 30339	33R00 5% 0.062W	QP05130339
3624		4822 051 30339	33R00 5% 0.062W	QP05130339
3625		4822 051 30339	33R00 5% 0.062W	QP05130339
3626		4822 051 30102	1k00 5% 0.062W	QP05130102
3627		4822 051 30471	470R00 5% 0.062W	QP05130471
3628		4822 051 30471	470R00 5% 0.062W	QP05130471
3629		4822 051 30472	4k70 5% 0.062W	QP05130472
3630		4822 051 30221	220R00 5% 0.062W	QP05130221
3631		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3632		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3633		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3635		4822 051 30682	6k80 5% 0.062W	QP05130682
3636		4822 051 30682	6k80 5% 0.062W	QP05130682
3637		4822 051 30332	3k30 5% 0.062W	QP05130332
3642		4822 051 30103	10k00 5% 0.062W	QP05130103
3647		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3648		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3651		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3654		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3655		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3656		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3657		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3658		4822 051 30102	1k00 5% 0.062W	QP05130102
3659		4822 051 30102	1k00 5% 0.062W	QP05130102
3660		4822 051 30102	1k00 5% 0.062W	QP05130102
3661		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3662		4822 051 30102	1k00 5% 0.062W	QP05130102
3663		4822 051 30102	1k00 5% 0.062W	QP05130102
3664		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3665		4822 117 12139	22R 5% 0.062W	QP11712139
3667		4822 051 30339	33R00 5% 0.062W	QP05130339
3672		4822 051 30479	47R00 5% 0.062W	QP05130479
3686		4822 051 30223	22k00 5% 0.062W	QP05130223
3687		4822 051 30223	22k00 5% 0.062W	QP05130223
3688		4822 051 30472	4k70 5% 0.062W	QP05130472
3689		4822 051 30223	22k00 5% 0.062W	QP05130223
3691		4822 051 30339	33R00 5% 0.062W	QP05130339
3702		4822 051 30102	1k00 5% 0.062W	QP05130102
3800		4822 051 30479	47R00 5% 0.062W	QP05130479
3801		4822 051 30339	33R00 5% 0.062W	QP05130339
3802		4822 051 30331	330R00 5% 0.062W	QP05130331
3805		4822 051 30479	47R00 5% 0.062W	QP05130479
3806		4822 051 30153	15K00 5% 0.062W	QP05130153
3808		4822 051 30332	3k30 5% 0.062W	QP05130332
3809		4822 051 30332	3k30 5% 0.062W	QP05130332
3810		4822 051 30332	3k30 5% 0.062W	QP05130332
3811		4822 051 30332	3k30 5% 0.062W	QP05130332
3812		5322 117 13042	3k9 1% 0.063W 0603 RC22H	QQ11713042
3813		5322 117 13042	3k9 1% 0.063W 0603 RC22H	QQ11713042
3814		4822 051 30339	33R00 5% 0.062W	QP05130339
3815		4822 051 30561	560R00 5% 0.062W	QP05130561
3816		4822 051 30101	100R00 5% 0.062W	QP05130101
3900		4822 051 30103	10k00 5% 0.062W	QP05130103
3901		4822 051 30103	10k00 5% 0.062W	QP05130103
3902		4822 051 30339	33R00 5% 0.062W	QP05130339
3903		4822 051 30339	33R00 5% 0.062W	QP05130339
3904		4822 051 30339	33R00 5% 0.062W	QP05130339

NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			MONO-RESISTORS	
3906		4822 051 30339	33R00 5% 0.062W	QP05130339
3907		2322 704 65609	0603 RC22H 56R PM1 R	QH70465609
3908		4822 051 30479	47R00 5% 0.062W	QP05130479
3909		4822 051 30332	3k30 5% 0.062W	QP05130332
3910		2322 704 65609	0603 RC22H 56R PM1 R	QH70465609
4000		4822 051 30008	0R00 JUMPER	QP05130008
4004		4822 051 30008	0R00 JUMPER	QP05130008
4005		4822 051 30008	0R00 JUMPER	QP05130008
4006		4822 051 30008	0R00 JUMPER	QP05130008
4452		4822 051 30008	0R00 JUMPER	QP05130008
4453		4822 051 30008	0R00 JUMPER	QP05130008
4500		4822 051 30008	0R00 JUMPER	QP05130008
4503		4822 051 30008	0R00 JUMPER	QP05130008
4507		4822 051 30008	0R00 JUMPER	QP05130008
4602		4822 051 30008	0R00 JUMPER	QP05130008
4603		4822 051 30008	0R00 JUMPER	QP05130008
4604		4822 051 30008	0R00 JUMPER	QP05130008
4801		4822 051 30008	0R00 JUMPER	QP05130008
4802		4822 051 30008	0R00 JUMPER	QP05130008
4803		4822 051 30008	0R00 JUMPER	QP05130008
4902		4822 051 30008	0R00 JUMPER	QP05130008
			MONO-SEMICONDUCTORS	
6200		4822 130 11397	DIODE BAS316	QP13011397
6301		9322 128 69685	DIODE S1D	QA12869685
6302		9322 128 69685	DIODE S1D	QA12869685
6303		9322 128 69685	DIODE S1D	QA12869685
6600		4822 130 11528	DIODE 1PS76SB10	QP13011528
7000		9337 144 60118	IC SM 74HCT4066D (PHSE) R	QN14460118
7001		4822 130 60373	BC856B	QP13060373
7002		4822 130 60511	BC847B	QP13060511
7003		4822 130 60511	BC847B	QP13060511
7006		4822 130 60511	BC847B	QP13060511
7007		4822 130 60511	BC847B	QP13060511
7100		5322 130 42718	BFS20	QQ13042718
7101		5322 130 42718	BFS20	QQ13042718
7102		9352 637 37518	IC TZA1033HL	QB63737518
7103		4822 209 17229	BA5938FM	QP20917229
7104		4822 209 30095	IC LM833D	QP20930095
7105		4822 209 32073	IC MC34072D	QP20932073
7106		5322 130 42718	BFS20	QQ13042718
7107		4822 209 33411	IC MC78L05ACD	QP20933411
7108		5322 130 60845	BC807-25	QQ13060845
7109		4822 209 15083	IC AN78M09	QP20915083
7110		5322 130 60803	BST72A	QQ13060803
7111		4822 130 60511	BC847B	QP13060511
7112		4822 130 60511	BC847B	QP13060511
7113		4822 130 60511	BC847B	QP13060511
7114		4822 130 60511	BC847B	QP13060511
7115		4822 130 60373	BC856B	QP13060373
7116		4822 130 60511	BC847B	QP13060511
7117		4822 130 42804	BC817-25	QP13042804
7201		9351 869 80118	IC DISPLAY, LCD	*D86980118
7202		3104 123 85860	IC AM29F002T/5.1.14	QW12385860
7203		4822 130 60373	BC856B	QP13060373
7204		9322 139 67685	IC SM MC33464N-45A	QA13967685
7207		4822 209 17231	IC SAA7399HL	QP20917231
7304		4822 209 16877	BA6856FP	QP20916877
7310		4822 209 15899	IC CY7C199-15C	QP20915899
7311		9352 622 13557	IC SAA7335HL	QB62213557
7312		4822 130 60373	BC856B	QP13060373
7315		4822 130 60511	BC847B	QP13060511
7400		9352 499 60118	IC SM 74LVC00AD	QB49960118
7402		4822 209 16318	IC MC33464N-30A	QP20916318
7404		9322 144 59668	IC SM MT48LC1M16A1TG-7S	QA14459668
7405		9322 144 59668	IC SM MT48LC1M16A1TG-7S	QA14459668
7452		4822 130 60511	BC847B	QP13060511

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
7453		4822 130 60511	BC847B	QP13060511
7454		4822 130 60511	BC847B	QP13060511
7455		4822 130 60373	BC856B	QP13060373
7503		9322 151 16671	IC STI5505AVC	QA15116671
7505		9322 156 81668	IC M24C32-WMN6TNKSA	QA15681668
7600		5322 209 71568	IC PC74HCT14T	QQ20971568
7604		4822 130 60511	BC847B	QP13060511
7605		4822 209 17398	IC LD1117DT33	QP20917398
7607		4822 130 60511	BC847B	QP13060511
7608		4822 130 60373	BC856B	QP13060373
7609		4822 130 60373	BC856B	QP13060373
7610		4822 130 60511	BC847B	QP13060511
7611		9352 456 80115		QB45680115
7612		4822 130 60511	BC847B	QP13060511
7613		4822 130 60511	BC847B	QP13060511
7614		4822 130 60511	BC847B	QP13060511
7615		4822 130 60511	BC847B	QP13060511
7617		4822 130 60511	BC847B	QP13060511
7618		4822 130 60511	BC847B	QP13060511
7620		4822 130 60373	BC856B	QP13060373
7621		4822 130 42804	BC817-25	QP13042804
7622		4822 209 17398	IC LD1117DT33	QP20917398
7700		9322 144 96668	IC SM MT48LC4M16A2TG-8E	QA14496668
7800		9352 680 19557	IC SAA7331HL/M1	QB68019557
7801		5322 130 42718	BFS20	QQ13042718
7900		4822 209 90752	IC 74HCT04D	QP20990752
7902		9322 153 36668	IC ICS302M-3	QA15336668
7903		9322 151 72668	IC ICS601M-01T	QA15172668
7905		9322 151 71668	IC MK2703STR	QA15171668
		3104 128 07940		QW12807940
			MONO -MISCELLANEOUS	
1001		2422 025 16957	FFC CON BM V 24P F 1.00 0.3	QU02516957
1104		2422 025 15963	FFC CON BM H 24P F 0.50	QU02515963
1106		2422 025 16158	FFC CON BM H 8P F 1.00 0.3	QU02516158
1205		2422 540 98428	RES CER 8M467	QU54098428
			CSTCC8.46MG	
1300		2422 540 98426	RES CER 6MHZ	QU54098426
			CSTCC6.00MG	
1301		4822 267 51454	CONN. 11P FEMALE	QP26751454
1603		2422 025 16389	FFC CON BM V 22P F 1.00 0.3	QU02516389
1604		2422 025 16388	FFC CON BM V 16P F 1.00 0.3	QU02516388
5200		4822 157 11717	BLM31P500SPT	QP15711717
5300		4822 157 11717	BLM31P500SPT	QP15711717
5301		4822 157 11717	BLM31P500SPT	QP15711717
5402		4822 157 11717	BLM31P500SPT	QP15711717
5403		4822 157 11499	BLM11P600SPT	QP15711499
5450		4822 157 11717	BLM31P500SPT	QP15711717
5501		4822 157 70299	2.2µH (NL322522T-2R2J)	QP15770299
5502		4822 157 70299	2.2µH (NL322522T-2R2J)	QP15770299
5503		4822 157 71206	BLM21A601SPT	QP15771206
5504		4822 157 71206	BLM21A601SPT	QP15771206
5600		4822 157 71206	BLM21A601SPT	QP15771206
5601		4822 157 11499	BLM11P600SPT	QP15711499
5602		4822 157 70298	15µH (NL322522T-150J)	QP15770298
5604		4822 157 70298	15µH (NL322522T-150J)	QP15770298
5605		4822 157 70298	15µH (NL322522T-150J)	QP15770298
5606		4822 157 70298	15µH (NL322522T-150J)	QP15770298
5607		4822 157 70298	15µH (NL322522T-150J)	QP15770298
5608		4822 157 70298	15µH (NL322522T-150J)	QP15770298
5609		4822 157 11717	BLM31P500SPT	QP15711717
5610		4822 157 11717	BLM31P500SPT	QP15711717
5611		4822 157 11717	BLM31P500SPT	QP15711717
5700		4822 157 11717	BLM31P500SPT	QP15711717
5800		4822 157 11717	BLM31P500SPT	QP15711717
5801		4822 157 11717	BLM31P500SPT	QP15711717
5802		4822 157 11717	BLM31P500SPT	QP15711717
5900		4822 157 11717	BLM31P500SPT	QP15711717
5901		4822 157 11717	BLM31P500SPT	QP15711717

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
5902		4822 157 11717	BLM31P500SPT	QP15711717
5903		4822 157 11717	BLM31P500SPT	QP15711717
			AV (PZ02) CIRCUIT BOARD	
			[N Only]	
			AV-CAPACITORS	
2308	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2314	N	4822 124 41584	100µF 20% 10V	QP12441584
2337	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2351	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2352	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2353	N	4822 124 40769	4.7µF 20% 100V	QP12440769
2354	N	4822 126 14076	220N 25V. P8020	QP12614076
2355	N	4822 124 40769	4.7µF 20% 100V	QP12440769
2357	N	4822 124 40769	4.7µF 20% 100V	QP12440769
2358	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2359	N	4822 124 40769	4.7µF 20% 100V	QP12440769
2360	N	4822 126 13692	47pF 1% NP0 63V	QP12613692
2361	N	4822 126 13692	47pF 1% NP0 63V	QP12613692
2362	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2363	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2364	N	4822 124 41584	100µF 20% 10V	QP12441584
2365	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2366	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2367	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2368	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2369	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2370	N	4822 124 40248	10µF 20% 63V	QP12440248
2371	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2372	N	4822 124 40769	4.7µF 20% 100V	QP12440769
2373	N	4822 124 40769	4.7µF 20% 100V	QP12440769
2374	N	4822 126 14076	220N 25V. P8020	QP12614076
2375	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2376	N	4822 124 40248	10µF 20% 63V	QP12440248
2377	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2378	N	4822 124 40769	4.7µF 20% 100V	QP12440769
2379	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2380	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2381	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2382	N	4822 124 40769	4.7µF 20% 100V	QP12440769
2383	N	4822 124 40769	4.7µF 20% 100V	QP12440769
2384	N	4822 126 14583	470nF 10% 16V XTR 0805	QP12614583
2385	N	4822 124 40769	4.7µF 20% 100V	QP12440769
2386	N	4822 126 14583	470nF 10% 16V XTR 0805	QP12614583
2387	N	4822 126 14583	470nF 10% 16V XTR 0805	QP12614583
2388	N	4822 126 14076	220N 25V. P8020	QP12614076
2389	N	4822 126 14583	470nF 10% 16V XTR 0805	QP12614583
2390	N	4822 122 33177	10nF 20% X7R 50V	QP12233177
2391	N	4822 122 33177	10nF 20% X7R 50V	QP12233177
2392	N	4822 126 14583	470nF 10% 16V XTR 0805	QP12614583
2393	N	4822 122 33177	10nF 20% X7R 50V	QP12233177
2394	N	4822 126 14076	220N 25V. P8020	QP12614076
2395	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2396	N	4822 124 40248	10µF 20% 63V	QP12440248
2397	N	4822 122 33177	10nF 20% X7R 50V	QP12233177
2398	N	4822 122 33177	10nF 20% X7R 50V	QP12233177
2399	N	4822 124 40248	10µF 20% 63V	QP12440248
2400	N	4822 122 33177	10nF 20% X7R 50V	QP12233177
2401	N	4822 126 14583	470nF 10% 16V XTR 0805	QP12614583
2402	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2403	N	4822 126 14076	220N 25V. P8020	QP12614076
2404	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2405	N	4822 126 13692	47pF 1% NP0 63V	QP12613692
2406	N	4822 126 13692	47pF 1% NP0 63V	QP12613692
2407	N	2222 780 15656	330N 16V 0805 X7R CER	QL78015656
2408	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2409	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2410	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2411	N	4822 124 40248	10µF 20% 63V	QP12440248
2412	N	4822 124 40433	47µF 20% 25V	QP12440433

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
2413	N	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2414	N	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2415	N	4822 124 40248	10µF 20% 63V	QP12440248
2416	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2417	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2418	N	2222 780 15656	330N 16V 0805 X7R CER	QL78015656
2419	N	4822 124 40433	47µF 20% 25V	QP12440433
2450	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2452	N	4822 126 14076	220N 25V. P8020	QP12614076
2453	N	4822 124 40433	47µF 20% 25V	QP12440433
2455	N	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2456	N	4822 124 22339	100µF 16V	QP12422339
2457	N	5322 126 10511	1nF 5%NP0 50V	QQ12610511
2458	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2459	N	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2460	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2461	N	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2462	N	4822 124 22339	100µF 16V	QP12422339
2463	N	5322 126 10511	1nF 5%NP0 50V	QQ12610511
2464	N	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2465	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2468	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2469	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2470	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2471	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2472	N	4822 124 40433	47µF 20% 25V	QP12440433
2473	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2474	N	4822 124 40433	47µF 20% 25V	QP12440433
2475	N	4822 124 40433	47µF 20% 25V	QP12440433
2476	N	4822 124 22339	100µF 16V	QP12422339
2479	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2480	N	5322 122 32531	100pF 5% NP0 50V	QQ12232531
2483	N	4822 124 22339	100µF 16V	QP12422339
2488	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2489	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2490	N	4822 124 40433	47µF 20% 25V	QP12440433
2491	N	4822 124 41584	100µF 20% 10V	QP12441584
2493	N	4822 126 13692	47pF 1% NP0 63V	QP12613692
2495	N	4822 124 40248	10µF 20% 63V	QP12440248
			AV-RESISTORS	
3300	N	4822 117 10353	150R 1% 0.1W	QP11710353
3301	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3302	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3303	N	4822 117 11927	75R 1% 0.1W	QP11711927
3304	N	4822 117 11507	6k8 1% 0.1W	QP11711507
3305	N	4822 117 11454	820R 1% 0.1W	QP11711454
3306	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3307	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3308	N	4822 117 10361	680R 1% 0.1W	QP11710361
3309	N	4822 117 10353	150R 1% 0.1W	QP11710353
3310	N	4822 117 11927	75R 1% 0.1W	QP11711927
3312	N	4822 117 11503	220R 1% 0.1W	QP11711503
3313	N	4822 051 20391	390R00 5% 0.1W	QP05120391
3314	N	4822 051 10102	1k00 2% 0.25W	QP05110102
3315	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3316	N	4822 117 10834	47k 1% 0.1W	QP11710834
3318	N	4822 117 10834	47k 1% 0.1W	QP11710834
3319	N	4822 051 10102	1k00 2% 0.25W	QP05110102
3320	N	4822 117 10834	47k 1% 0.1W	QP11710834
3321	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3322	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3323	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3325	N	4822 117 10834	47k 1% 0.1W	QP11710834
3327	N	4822 117 11927	75R 1% 0.1W	QP11711927
3329	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3330	N	4822 117 11927	75R 1% 0.1W	QP11711927
3331	N	4822 117 11145	4k70 1% 0.1W	QP11711145
3332	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3333	N	4822 117 10353	150R 1% 0.1W	QP11710353

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			AV-RESISTORS	
3334	N	4822 117 10357	4K3 1% 0.2W	QP11710357
3335	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3336	N	4822 117 11927	75R 1% 0.1W	QP11711927
3338	N	4822 117 10833	10k 1% 0.1W	QP11710833
3339	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3340	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3341	N	4822 117 10833	10k 1% 0.1W	QP11710833
3342	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3343	N	4822 117 11927	75R 1% 0.1W	QP11711927
3345	N	4822 117 11927	75R 1% 0.1W	QP11711927
3347	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3348	N	4822 051 10102	1k00 2% 0.25W	QP05110102
3349	N	4822 117 10834	47k 1% 0.1W	QP11710834
3350	N	4822 117 10833	10k 1% 0.1W	QP11710833
3351	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3352	N	4822 051 20562	5K6 5% 0.1W 0805	QP05120562
3353	N	4822 051 10102	1k00 2% 0.25W	QP05110102
3354	N	4822 117 11927	75R 1% 0.1W	QP11711927
3355	N	4822 051 20339	33R00 5% 0.1W	QP05120339
3356	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3357	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3359	N	4822 117 10834	47k 1% 0.1W	QP11710834
3360	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3362	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3363	N	4822 051 10102	1k00 2% 0.25W	QP05110102
3364	N	2322 734 65609	56R 0805 RC12H PM1 R	QH73465609
3365	N	4822 051 20561	560R00 5% 0.1W	QP05120561
3366	N	4822 117 10834	47k 1% 0.1W	QP11710834
3367	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3368	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3378	N	4822 051 10102	1k00 2% 0.25W	QP05110102
3394	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3395	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3397	N	4822 117 10834	47k 1% 0.1W	QP11710834
3398	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3399	N	4822 051 20562	5K6 5% 0.1W 0805	QP05120562
3400	N	4822 117 11927	75R 1% 0.1W	QP11711927
3401	N	4822 117 11927	75R 1% 0.1W	QP11711927
3402	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3403	N	4822 117 11927	75R 1% 0.1W	QP11711927
3404	N	4822 117 11927	75R 1% 0.1W	QP11711927
3405	N	4822 117 11927	75R 1% 0.1W	QP11711927
3406	N	4822 117 11927	75R 1% 0.1W	QP11711927
3407	N	4822 117 11927	75R 1% 0.1W	QP11711927
3408	N	4822 117 11927	75R 1% 0.1W	QP11711927
3409	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3410	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3411	N	4822 117 11927	75R 1% 0.1W	QP11711927
3413	N	4822 117 10834	47k 1% 0.1W	QP11710834
3414	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3415	N	4822 051 20223	22k00 5% 0.1W	QP05120223
3416	N	4822 051 20339	33R00 5% 0.1W	QP05120339
3417	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3418	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3419	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3420	N	4822 117 11149	82k 1% 0.1W	QP11711149
3421	N	4822 117 11504	270R 1% 0.1W	QP11711504
3422	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3423	N	2322 734 65609	0805 RC12H 56R PM1 R	QH73465609
3424	N	4822 051 20223	22k00 5% 0.1W	QP05120223
3425	N	4822 117 11927	75R 1% 0.1W	QP11711927
3427	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3429	N	4822 117 11927	75R 1% 0.1W	QP11711927
3431	N	4822 051 20471	470R00 5% 0.1W	QP05120471
3432	N	4822 117 11927	75R 1% 0.1W	QP11711927
3433	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3434	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3435	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3436	N	4822 117 10353	150R 1% 0.1W	QP11710353
3437	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3438	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3439	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3440	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3441	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3442	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3444	N	4822 117 10833	10k 1% 0.1W	QP11710833
3445	N	4822 117 10833	10k 1% 0.1W	QP11710833
3448	N	4822 117 10833	10k 1% 0.1W	QP11710833
3451	N	4822 117 10833	10k 1% 0.1W	QP11710833
3452	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3453	N	4822 117 10833	10k 1% 0.1W	QP11710833
3454	N	4822 117 10833	10k 1% 0.1W	QP11710833
3455	N	4822 117 10833	10k 1% 0.1W	QP11710833
3456	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3457	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3458	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3459	N	4822 117 10833	10k 1% 0.1W	QP11710833
3460	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3461	N	4822 117 10833	10k 1% 0.1W	QP11710833
3464	N	4822 117 10833	10k 1% 0.1W	QP11710833
3468	N	4822 117 10837	100k 1% 0.1W	QP11710837
3471	N	4822 051 20562	5K6 5% 0.1W 0805	QP05120562
3472	N	4822 117 11152	4R7 5%	QP11711152
3473	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3476	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3477	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3478	N	4822 117 10837	100k 1% 0.1W	QP11710837
3479	N	4822 117 13085	5K6 1% RC12H 0.1W 0805	QP11713085
3481	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3482	N	4822 117 10833	10k 1% 0.1W	QP11710833
3486	N	4822 117 10837	100k 1% 0.1W	QP11710837
3489	N	4822 051 20562	5K6 5% 0.1W 0805	QP05120562
3491	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3492	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3494	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3495	N	4822 117 10837	100k 1% 0.1W	QP11710837
3498	N	4822 051 20562	5K6 5% 0.1W 0805	QP05120562
3505	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3506	N	4822 117 10833	10k 1% 0.1W	QP11710833
3507	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3508	N	4822 117 12521	68R 1% 0.1W	QP11712521
3509	N	4822 117 10834	47k 1% 0.1W	QP11710834
3510	N	4822 117 11152	4R7 5%	QP11711152
3513	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3514	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3515	N	4822 117 10837	100k 1% 0.1W	QP11710837
3516	N	4822 117 11152	4R7 5%	QP11711152
3517	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3518	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3519	N	4822 051 20562	5K6 5% 0.1W 0805	QP05120562
3520	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3521	N	4822 051 10102	1k00 2% 0.25W	QP05110102
3522	N	4822 051 10102	1k00 2% 0.25W	QP05110102
3524	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3525	N	4822 117 10833	10k 1% 0.1W	QP11710833
3527	N	4822 117 10834	47k 1% 0.1W	QP11710834
3600	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3601	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3602	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3603	N	4822 117 10837	100k 1% 0.1W	QP11710837
3604	N	4822 117 11449	2k2 5% 0.1W 0805	QP11711449
3605	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3606	N	4822 051 20561	560R00 5% 0.1W	QP05120561
3607	N	4822 051 20562	5K6 5% 0.1W 0805	QP05120562
3608	N	4822 117 10837	100k 1% 0.1W	QP11710837
3609	N	4822 051 20822	8K20 5% 0.1W	QP05120822
3610	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3611	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3612	N	4822 117 10833	10k 1% 0.1W	QP11710833

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			AV-RESISTORS	
3613	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3614	N	4822 117 10833	10k 1% 0.1W	QP11710833
3615	N	4822 117 11152	4R7 5%	QP11711152
3616	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3617	N	4822 117 10833	10k 1% 0.1W	QP11710833
3618	N	4822 117 10361	680R 1% 0.1W	QP11710361
3619	N	4822 117 10833	10k 1% 0.1W	QP11710833
3620	N	4822 051 10008	0R00 5% 0.25W	QP05110008
3621	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3622	N	4822 117 10833	10k 1% 0.1W	QP11710833
3623	N	4822 117 11139	1k5 1% 0.1W	QP11711139
3624	N	4822 117 10833	10k 1% 0.1W	QP11710833
3625	N	4822 051 10102	1k00 2% 0.25W	QP05110102
3628	N	4822 117 11139	1k5 1% 0.1W	QP11711139
3999	N	4822 117 12842		QP11712842
4301	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
4304	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
4305	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
			AV-SEMICONDUCTORS	
6300	N	3198 020 55680	DIODE REG SM BZX384-C5V6	QG02055680
6301	N	4822 130 83757	DIODE BAS216	QP13083757
6302	N	4822 130 83757	DIODE BAS216	QP13083757
6303	N	4822 130 83757	DIODE BAS216	QP13083757
6306	N	9322 154 46685	DIODE REC SM RB501V-40	QA15446685
6307	N	9322 154 46685	DIODE REC SM RB501V-40	QA15446685
6308	N	9322 154 46685	DIODE REC SM RB501V-40	QA15446685
6309	N	4822 130 11383	DIODE BZX284-C5V1	QP13011383
6400	N	4822 130 10845	OPT FIB CON GP1F32T	QP13010845
6400	N	9322 155 28667	OPT FIB CON GP1FA550TZ	QA15528667
7300	N	4822 130 60373	BC856B	QP13060373
7301	N	4822 130 60511	BC847B	QP13060511
7302	N	4822 130 60511	BC847B	QP13060511
7303	N	4822 130 60511	BC847B	QP13060511
7304	N	9322 134 86668	IC LF80C	QA13486668
7305	N	9322 135 58671	IC SM STV6410AD (ST00) Y	QA13558671
7306	N	4822 130 60511	BC847B	QP13060511
7307	N	4822 130 60511	BC847B	QP13060511
7308	N	4822 130 60511	BC847B	QP13060511
7309	N	4822 130 60511	BC847B	QP13060511
7310	N	4822 130 60511	BC847B	QP13060511
7311	N	4822 130 60511	BC847B	QP13060511
7312	N	4822 130 60373	BC856B	QP13060373
7313	N	4822 130 60511	BC847B	QP13060511
7314	N	4822 130 42804	BC817-25	QP13042804
7315	N	4822 130 42804	BC817-25	QP13042804
7316	N	4822 209 16256	IC TDA4780/V4	QP20916256
7320	N	4822 130 60511	BC847B	QP13060511
7321	N	4822 130 42804	BC817-25	QP13042804
7322	N	4822 130 60511	BC847B	QP13060511
7324	N	4822 130 42804	BC817-25	QP13042804
7325	N	4822 130 60511	BC847B	QP13060511
7326	N	4822 130 60373	BC856B	QP13060373
7327	N	4822 130 60511	BC847B	QP13060511
7328	N	4822 130 60511	BC847B	QP13060511
7329	N	4822 130 60511	BC847B	QP13060511
7330	N	4822 130 60511	BC847B	QP13060511
7331	N	4822 130 40981	BC337-25	QP13040981
7332	N	4822 130 60373	BC856B	QP13060373
7333	N	4822 130 41246	BC327-25	QP13041246
7334	N	4822 130 60511	BC847B	QP13060511
7335	N	4822 130 60511	BC847B	QP13060511
7336	N	4822 130 42804	BC817-25	QP13042804
7337	N	4822 130 42804	BC817-25	QP13042804
7400	N	4822 209 17398	IC LD1117DT33	QP20917398
7401	N	4822 209 17423	IC UAD1328T	QP20917423
7402	N	4822 130 42804	BC817-25	QP13042804

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
7403	N	4822 209 32071	IC MC33079D	QP20932071
7408	N	4822 209 32071	IC MC33079D	QP20932071
7413	N	5322 209 14481	IC HEF4053BT	QQ20914481
7414	N	4822 209 30095	IC LM833D	QP20930095
7415	N	4822 130 42804	BC817-25	QP13042804
7416	N	4822 130 42804	BC817-25	QP13042804
7417	N	4822 130 60373	BC856B	QP13060373
7419	N	4822 130 42804	BC817-25	QP13042804
7420	N	4822 130 42804	BC817-25	QP13042804
7421	N	4822 130 42804	BC817-25	QP13042804
7422	N	4822 130 44568	BC557B	QP13044568
7423	N	4822 130 60511	BC847B	QP13060511
			AV-MISCELLANEOUS	
1300	N	4822 265 11154	52030-2210 (22P)	QP26511154
1301	N	4822 265 11103	52030-1610 (16P)	QP26511103
1303	N	4822 267 10994	4P, MDIN	QP26710994
1304	N	2422 033 00334	CON BM EURO H 42P F BK GRND-L	QU03300334
1402	N	2422 026 05089	CON BM CINCH H 3P F RDWHYE B	QU02605089
1405	N	4822 267 31626		QP26731626
5400	N	4822 157 70601	100µH (920927085A)	QP15770601
			AV (PZ02) CIRCUIT BOARD [F, S, U Only]	
			AV-CAPACITORS	
2000	F,U,S	3198 028 41090	10µF 20% 35V	QG02841090
2001	F,U,S	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2002	F,U,S	4822 126 13692	47pF 1% NP0 63V	QP12613692
2004	F,U,S	4822 126 13692	47pF 1% NP0 63V	QP12613692
2006	F,U,S	4822 124 41796	22µF 20% 16V	QP12441796
2007	F,U,S	4822 124 23432	100µF 20% 10V	QP12423432
2029	F,U,S	4822 124 81286	47µF 20% 16V	QP12481286
2030	F,U,S	4822 126 13482	470nF +80%-20% 16V	QP12613482
2032	F,U,S	4822 126 13482	470nF +80%-20% 16V	QP12613482
2033	F,U,S	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2036	F,U,S	4822 124 40207	100µF 20% 25V	QP12440207
2038	F,U,S	4822 124 41584	100µF 20% 10V	QP12441584
2039	F,U,S	4822 124 40184	1000µF 20% 10V	QP12440184
2040	F,U,S	4822 124 40207	100µF 20% 25V	QP12440207
2041	F,U,S	4822 124 41643	100µF 20% 16V DIM:6,3X11MM	QP12441643
2100	F,U,S	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2101	F,U,S	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2103	F,U,S	4822 124 22339	100µF 16V	QP12422339
2104	F,U,S	5322 122 31647	1nF 10%X7R 63V	QQ12231647
2106	F,U,S	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2107	F,U,S	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2108	F,U,S	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2109	F,U,S	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2110	F,U,S	4822 124 81286	47µF 20% 16V	QP12481286
2112	F,U,S	4822 124 22339	100µF 16V	QP12422339
2113	F,U,S	5322 122 31647	1nF 10%X7R 63V	QQ12231647
2115	F,U,S	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2119	F,U,S	5322 122 31647	1nF 10%X7R 63V	QQ12231647
2121	F,U,S	5322 122 31647	1nF 10%X7R 63V	QQ12231647
2123	F,U,S	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2124	F,U,S	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2125	F,U,S	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2126	F,U,S	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2130	F,U,S	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2131	F,U,S	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2134	F,U,S	4822 124 11947	10µF 20% 16V	QP12411947
			AV-RESISTORS	
3000	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3001	F,U,S	4822 117 12521	68R 1% 0.1W	QP11712521
3002	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3003	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3004	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			AV-RESISTORS	
3005	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472
3006	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472
3007	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3008	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3009	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472
3010	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472
3011	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472
3012	F,U,S	4822 117 11152	4R7 5%	QP11711152
3014	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3015	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3016	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3017	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3036	F,U,S	4822 117 11449	2k2 5% 0.1W 0805	QP11711449
3038	F,U,S	4822 051 20223	22k00 5% 0.1W	QP05120223
3039	F,U,S	4822 051 20223	22k00 5% 0.1W	QP05120223
3040	F,U,S	4822 116 83933	15K 1% 0.1W	QP11683933
3041	F,U,S	4822 051 20822	8K20 5% 0.1W	QP05120822
3042	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3043	F,U,S	4822 117 11504	270R 1% 0.1W	QP11711504
3044	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3045	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3046	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3047	F,U,S	4822 117 11507	6k8 1% 0.1W	QP11711507
3048	F,U,S	4822 117 11454	820R 1% 0.1W	QP11711454
3049	F,U,S	4822 117 11927	75R 1% 0.1W	QP11711927
3050	F,U,S	4822 051 20471	470R00 5% 0.1W	QP05120471
3051	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472
3052	F,U,S	4822 117 10361	680R 1% 0.1W	QP11710361
3054	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3055	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3056	F,U,S	4822 117 11504	270R 1% 0.1W	QP11711504
3057	F,U,S	4822 117 11152	4R7 5%	QP11711152
3058	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3059	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3060	F,U,S	4822 117 11507	6k8 1% 0.1W	QP11711507
3061	F,U,S	4822 117 11454	820R 1% 0.1W	QP11711454
3062	F,U,S	4822 117 11927	75R 1% 0.1W	QP11711927
3063	F,U,S	4822 117 11449	2k2 5% 0.1W 0805	QP11711449
3064	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472
3065	F,U,S	4822 117 10361	680R 1% 0.1W	QP11710361
3066	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3067	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3068	F,U,S	4822 117 11504	270R 1% 0.1W	QP11711504
3069	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3070	F,U,S	4822 117 11507	6k8 1% 0.1W	QP11711507
3071	F,U,S	4822 117 11454	820R 1% 0.1W	QP11711454
3072	F,U,S	4822 117 11927	75R 1% 0.1W	QP11711927
3073	F,U,S	4822 117 11449	2k2 5% 0.1W 0805	QP11711449
3074	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472
3075	F,U,S	4822 117 10361	680R 1% 0.1W	QP11710361
3076	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3077	F,U,S	4822 117 11927	75R 1% 0.1W	QP11711927
3078	F,U,S	4822 117 11449	2k2 5% 0.1W 0805	QP11711449
3100	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3101	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472
3102	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3103	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3105	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3106	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3107	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3108	F,U,S	4822 117 11152	4R7 5%	QP11711152
3109	F,U,S	4822 117 11152	4R7 5%	QP11711152
3110	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3112	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3113	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3114	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3115	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3116	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3117	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3118	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3119	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3120	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3121	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3122	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3123	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3124	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3126	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3127	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3129	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3130	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3131	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3132	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3135	F,U,S	5322 117 12487	1k RC12G 1% 0.125W	QQ11712487
3136	F,U,S	5322 117 12487	1k RC12G 1% 0.125W	QQ11712487
3137	F,U,S	4822 117 12635	10R 1% 0.125W	QP11712635
3138	F,U,S	4822 117 11139	1k5 1% 0.1W	QP11711139
3139	F,U,S	4822 117 11931	750R 1% 0.1W	QP11711931
3140	F,U,S	2120 108 92619	2k2 SM0805 ERJ6EN PM1	*E10892619
3141	F,U,S	5322 117 12487	1k RC12G 1% 0.125W	QQ11712487
3142	F,U,S	5322 117 12487	1k RC12G 1% 0.125W	QQ11712487
3143	F,U,S	5322 117 12487	1k RC12G 1% 0.125W	QQ11712487
3144	F,U,S	4822 117 11953	560R 1% 0.1W	QP11711953
3145	F,U,S	2120 108 92625	5K6 0805 ERJ6EN PM1	*E10892625
3146	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3147	F,U,S	2120 108 92616	1k2 0805 ERJ6EN PM1	*E10892616
3148	F,U,S	5322 117 12487	1k RC12G 1% 0.125W	QQ11712487
3150	F,U,S	4822 117 11927	75R 1% 0.1W	QP11711927
3153	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3154	F,U,S	4822 117 11927	75R 1% 0.1W	QP11711927
3157	F,U,S	4822 117 11927	75R 1% 0.1W	QP11711927
3158	F,U,S	4822 117 11449	2k2 5% 0.1W 0805	QP11711449
3159	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3160	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
4100	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
4105	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
4112	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
			AV-SEMICONDUCTORS	
6001	F,U,S	4822 130 11087	DIODE BZX284-C15	QP13011087
6002	F,U,S	4822 130 11087	DIODE BZX284-C15	QP13011087
6003	F,U,S	4822 130 11087	DIODE BZX284-C15	QP13011087
6004	F,U,S	4822 130 11087	DIODE BZX284-C15	QP13011087
6005	F,U,S	4822 130 11087	DIODE BZX284-C15	QP13011087
6006	F,U,S	4822 130 11087	DIODE BZX284-C15	QP13011087
6007	F,U,S	4822 130 83757	DIODE BAS216	QP13083757
6008	F,U,S	4822 130 83757	DIODE BAS216	QP13083757
6009	F,U,S	4822 130 83757	DIODE BAS216	QP13083757
6010	F,U,S	4822 130 11087	DIODE BZX284-C15	QP13011087
7000	F,U,S	4822 130 60511	BC847B	QP13060511
7001	F,U,S	4822 130 42804	BC817-25	QP13042804
7002	F,U,S	4822 130 60373	BC856B	QP13060373
7004	F,U,S	4822 130 42804	BC817-25	QP13042804
7005	F,U,S	4822 130 42804	BC817-25	QP13042804
7006	F,U,S	4822 130 60511	BC847B	QP13060511
7007	F,U,S	4822 130 60511	BC847B	QP13060511
7008	F,U,S	4822 130 60511	BC847B	QP13060511
7009	F,U,S	4822 130 60373	BC856B	QP13060373
7010	F,U,S	4822 130 60511	BC847B	QP13060511
7011	F,U,S	4822 130 60511	BC847B	QP13060511
7012	F,U,S	4822 130 60373	BC856B	QP13060373
7013	F,U,S	4822 130 60511	BC847B	QP13060511
7014	F,U,S	4822 130 60511	BC847B	QP13060511
7015	F,U,S	4822 130 60373	BC856B	QP13060373
7016	F,U,S	4822 130 60511	BC847B	QP13060511
7017	F,U,S	4822 130 60511	BC847B	QP13060511
7018	F,U,S	4822 130 60511	BC847B	QP13060511
7019	F,U,S	4822 130 60511	BC847B	QP13060511

NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			AV-SEMICONDUCTORS	
7020	F,U,S	9322 155 28667	OPT FIB CON GP1FA550TZ	QA15528667
7103	F,U,S	4822 209 17423	IC UAD1328T	QP20917423
7104	F,U,S	4822 130 42804	BC817-25	QP13042804
7105	F,U,S	4822 130 42804	BC817-25	QP13042804
7108	F,U,S	4822 130 42804	BC817-25	QP13042804
7109	F,U,S	4822 130 42804	BC817-25	QP13042804
7110	F,U,S	4822 209 16978	IC LF33CV	QP20916978
7112	F,U,S	4822 130 42804	BC817-25	QP13042804
7114	F,U,S	4822 130 42804	BC817-25	QP13042804
7115	F,U,S	4822 209 30095	IC LM833D	QP20930095
7116	F,U,S	9322 141 80668	IC AD8073JR	QA14180668
7117	F,U,S	4822 209 72684	IC L7905CV	QP20972684
			AV-MISCELLANEOUS	
1002	F,U,S	2422 026 05202	SOC CINCH H 6P F RDWHYE B	QU02605202
1003	F,U,S	2422 026 05188	CON BM MDIN H 3P F TCS7927 B	QU02605188
1004	F,U,S	4822 265 11154	52030-2210 (22P)	QP26511154
1005	F,U,S	4822 267 31626		QP26731626
1006	F,U,S	2422 026 05191	CON BM CINCH H 3P F RDBUGN B	QU02605191
1007	F,U,S	2422 025 16525	FFC CON BM V 16P F 1.00 0.3	QU02516525
5000	F,U,S	4822 157 70601	100µH (920927085A)	QP15770601
5003	F,U,S	4822 242 10756	DSS306-92Y5S221M100	QP24210756
5004	F,U,S	4822 242 10756	DSS306-92Y5S221M100	QP24210756
5005	F,U,S	4822 242 10756	DSS306-92Y5S221M100	QP24210756
5006	F,U,S	4822 242 10756	DSS306-92Y5S221M100	QP24210756
5007	F,U,S	4822 242 10756	DSS306-92Y5S221M100	QP24210756
			SWITCHED MODE POWER SUPPLY UNIT (PZ03)	
⚠ PZ03		3104 129 22150	POWER SUPPLY UNIT	QW12922150

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			PF16-RC-6 IN / OUT	
			CIRCUIT BOARD	
			PF16-CAPACITORS	
CF01		4822 124 90353	ELECT. 100µF M 10V RA-2	OA10701020
CF03		4822 124 90352	ELECT. 10µF M 16V RA-2	OA10601620
CF51		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CF52		4822 126 11568	CER. 470pF GR39	DK96471300
			PF16-RESISTORS	
RF01		4822 051 30472	CHIP 4.7k ±5% 1/16W	NN05472610
RF02		4822 117 12925	CHIP 47k ±5% 1/16W	NN05473610
RF03		4822 051 30101	CHIP 100 ±5% 1/16W	NN05101610
RF51		4822 117 12139	CHIP 22 ±5% 1/16W	NN05220610
RF52		4822 051 30103	CHIP 10k ±5% 1/16W	NN05103610
RF53		4822 051 30222	CHIP 2.2k ±5% 1/16W	NN05222610
RF54		4822 051 30103	CHIP 10k ±5% 1/16W	NN05103610
			PF16-SEMICONDUCTORS	
DF01		4822 130 83715	CHIP DIODE 1SS301 DAN202U	HZ21005000
QF01		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QF51		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
			PF16-SEMICONDUCTORS	
JF52		4822 267 41009	TERMINAL 2P RCA PIN JACK	YT02020890
LF01		4822 157 10416	BLM11B102S 1608 EMI FILTER	FN31010030
SF51		4822 277 21559	SLIDE SW. INT/EXT	SS02021150
			PH16-POWER SUPPLY	
			CIRCUIT BOARD	
			PH16-CAPACITORS	
C803		4822 124 41458	ELECT. 4700µF 16V RA2	OA47801620
C805		4822 124 22039	ELECT. 220µF 16V ARA	OA22701650
C806		4822 124 41458	ELECT. 4700µF 16V RA2	OA47801620
C815	F	4822 124 12404	ELECT. 220µF M 16V RA-2	OA22701620
C815	N	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
C815	S	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
C815	U	4822 124 12404	ELECT. 220µF M 16V RA-2	OA22701620
C817	F	4822 124 90353	ELECT. 100µF M 10V RA-2	OA10701020
C817	U	4822 124 90353	ELECT. 100µF M 10V RA-2	OA10701020
C818	N	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
C818	S	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
C823		9965 000 00605	ELECT. 3300µF 25V ±20% HIFI	OB33802510
C824		9965 000 00605	ELECT. 3300µF 25V ±20% HIFI	OB33802510
C827		4822 124 41535	ELECT. 100µF M 25V RA-2	OA10702520
C828		4822 124 41535	ELECT. 100µF M 25V RA-2	OA10702520
C829	F	4822 124 11574	ELECT. 1000µF M 16V ARA	OA10801650
C829	N	9965 000 10843	ELECT. 470µF 25V ARS	OA47702540
C829	S	9965 000 10843	ELECT. 470µF 25V ARS	OA47702540
C829	U	4822 124 11574	ELECT. 1000µF M 16V ARA	OA10801650
C830	F	4822 124 11574	ELECT. 1000µF M 16V ARA	OA10801650
C830	N	9965 000 10843	ELECT. 470µF 25V ARS	OA47702540
C830	S	9965 000 10843	ELECT. 470µF 25V ARS	OA47702540
C830	U	4822 124 11574	ELECT. 1000µF M 16V ARA	OA10801650
C843		4822 124 22723	ELECT. 1000µF M 25V RA-2	OA10802520
C845		4822 124 12404	ELECT. 220µF M 16V RA-2	OA22701620
C851		4822 126 11703	CER. 0.01µF	DK98103300
C852		4822 126 11703	CER. 0.01µF	DK98103300
C853		4822 126 11703	CER. 0.01µF	DK98103300
C854		4822 126 11703	CER. 0.01µF	DK98103300
CN01		4822 124 41543	ELECT. 1µF M 50V RA-2	OA10505020
CN02		4822 124 40763	ELECT. 2.2µF M 50V RA-2	OA22505020
CN03		4822 124 23649	ELECT. 470µF 25V M RA-2	OA47702520
CN21		4822 124 80067	ELECT. 4.7µF M 50V RA-2	OA47505020
CN22		4822 124 22273	ELECT. 0.47µF M 50V RA-2	OA47405020
CN23		5322 122 32654	CER. 0.022µF ±10% XTR 16V	DK96223200
			PH16-RESISTORS	
R801		9965 000 06703	CHIP 1.2k ±1% 1/10W	NI01122110
R802		9965 000 06703	CHIP 1.2k ±1% 1/10W	NI01122110
R804		9965 000 06704	CHIP 2.2k ±1% 1/10W	NI01222110

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
R823			RES. 680 ±5% 1/6W	GD05681160
R824			RES. 680 ±5% 1/6W	GD05681160
R825	N	9965 000 10842	METAL 1k ±5% 1W	NK05102010
R825	S	9965 000 10842	METAL 1k ±5% 1W	NK05102010
R826	N	9965 000 10842	METAL 1k ±5% 1W	NK05102010
R826	S	9965 000 10842	METAL 1k ±5% 1W	NK05102010
RN01		4822 051 30102	CHIP 1k ±5% 1/16W	NN05102610
RN02		9965 000 06699	CHIP 3.9M ±5% 1/16W	NN05395610
RN03		4822 116 83819	CHIP 18k ±5% 1/16W	NN05183610
RN04		4822 117 12925	CHIP 47k ±5% 1/16W	NN05473610
RN05		4822 051 30103	CHIP 10k ±5% 1/16W	NN05103610
RN06		4822 051 30222	CHIP 2.2k ±5% 1/16W	NN05222610
RN07		4822 051 30103	CHIP 10k ±5% 1/16W	NN05103610
RN08		4822 051 30472	CHIP 4.7k ±5% 1/16W	NN05472610
RN09		4822 051 30472	CHIP 4.7k ±5% 1/16W	NN05472610
RN10		4822 051 30223	CHIP 22k ±5% 1/16W	NN05223610
RN21		4822 051 30332	CHIP 3.3k ±5% 1/16W	NN05332610
RN22		4822 051 30332	CHIP 3.3k ±5% 1/16W	NN05332610
RN23		4822 117 13632	CHIP 100k ±5% 1/16W	NN05104610
RN24		4822 117 12925	CHIP 47k ±5% 1/16W	NN05473610
RN25		4822 051 30333	CHIP 33k ±5% 1/16W	NN05333610
RN26		4822 051 30103	CHIP 10k ±5% 1/16W	NN05103610
RN27		4822 117 13632	CHIP 100k ±5% 1/16W	NN05104610
			PH16-SEMICONDUCTORS	
⚠ D801				
~		9965 000 09763	DIODE SHOTTKY	HD20055100
⚠ D804			11EQS10 1A 100V	
⚠ D821				
⚠ D823		9965 000 09763	DIODE SHOTTKY	HD20055100
⚠ D824			11EQS10 1A 100V	
D825		4822 130 80623	ZENER DIODE 13V	HD31301000
D826		4822 130 80623	ZENER DIODE 13V	HD31301000
D827		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D828		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
⚠ D841				
~		9965 000 09763	DIODE SHOTTKY	HD20055100
⚠ D844			11EQS10 1A 100V	
DH01		9965 000 09763	DIODE SHOTTKY	HD20055100
			11EQS10 1A 100V	
⚠ DN01				
~		9965 000 09763	DIODE SHOTTKY	HD20055100
⚠ DN05			11EQS10 1A 100V	
DN06		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
DN07		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
DN08		4822 130 33948	ZENER DIODE 5.6V	HD30561000
DN20		4822 130 83715	CHIP DIODE 1SS301 DAN202U	HZ21005000
⚠ Q801		9965 000 06702	IC PQ15RW11 3.0 15V	HC38915320
			VARIABLE	
⚠ Q811		4822 209 73096	IC NJM78M05FA	HC38505090
⚠ Q812		9965 000 03397	IC BA033FP 3.3V 1A PD=1W	HC96J33210
Q821		4822 130 11604	TRS. 2SB1020	HT21020100
Q822		4822 130 11605	TRS. 2SD1415	HT41415100
⚠ Q841		4822 209 82828	IC NJM78M12FA	HC38512090
QN01		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QN02		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QN03		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QN04		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QN05		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QN20		4822 209 83312	IC TA7317P	HC10042050
			PH16-MISCELLANEOUS	
⚠ F801		4822 070 32001	FUSE T2A 250V BS LISTED	FS10200850
⚠ F821		4822 070 38001	FUSE T800mA 250V	FS10080850
			BS LISTED	

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
⚠ F822		4822 070 38001	FUSE T800mA 250V	FS10080850
			BS LISTED	
⚠ F841		4822 070 34001	FUSE T400MA 250V	FS10040850
			BS LISTED	
⚠ FH01	F	4822 070 32001	FUSE T2A 250V BS LISTED	FS10200850
⚠ FH01	N	9965 000 06705	FUSE T1A H 250V	FS10100950
			BUSS MANN S505	
⚠ FH01	S	9965 000 06705	FUSE T1A H 250V	FS10100950
			BUSS MANN S505	
⚠ FH01	U	4822 070 32001	FUSE T2A 250V BS LISTED	FS10200850
⚠ GH05		4822 121 43732	FILM CAP. 0.01µF M 250V AC	DF77103500
⚠ JH01		9965 000 06707	JACK 2P AC INLET M1818-A	YJ04002510
⚠ JH04			PLUG 4PIN B4P7-VH	YP04000930
⚠ JH05		4822 265 20359	PLUG CONNECTOR 2P	YP04000760
⚠ LH02		4822 280 80754	RELAY	LY10120380
			VS-12MB.TV-5 UL/CSA/SEMKO	
⚠ SH02		4822 277 21825	SLIDE SW. SDKGA4 SEMKO	SS02021510
			PN16-MUTE CIRCUIT BOARD	
			[N Only]	
DN92	N	5322 130 11288	CHIP DIODE MA8047-M 4.7V	HZ30471000
DN93	N	4822 130 83715	CHIP DIODE 1SS301 DAN202U	HZ21005000
QN91	N	4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
RN92	N	4822 051 30152	CHIP 1.5kΩ ±5% 1/16W	NN05152610
RN93	N	4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
			PP16-DAC CIRCUIT BOARD	
			PP16-CAPACITORS	
C101	F		FILM 1800pF 100V PP APSV	OF15182540
C101	N	9965 000 10845	FILM 1800pF J 100V NH	OF15182550
C101	S	9965 000 10845	FILM 1800pF J 100V NH	OF15182550
C101	U		FILM 1800pF 100V PP APSV	OF15182540
C102		4822 121 70437	FILM 1000pF J 100V APSV	OF15102540
C103		9965 000 05891	FILM 470pF 100V PP APSV	OF15471540
C111	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C111	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C111	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C111	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C112	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C112	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C112	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C112	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C151	F		FILM 1800pF 100V PP APSV	OF15182540
C151	N	9965 000 10845	FILM 1800pF J 100V NH	OF15182550
C151	S	9965 000 10845	FILM 1800pF J 100V NH	OF15182550
C151	U		FILM 1800pF 100V PP APSV	OF15182540
C152		4822 121 70437	FILM 1000pF J 100V APSV	OF15102540
C153		9965 000 05891	FILM 470pF 100V PP APSV	OF15471540
C161	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C161	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C161	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C161	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C162	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C162	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C162	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C162	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C201	F		FILM 1800pF 100V PP APSV	OF15182540
C201	N	9965 000 10845	FILM 1800pF J 100V NH	OF15182550
C201	S	9965 000 10845	FILM 1800pF J 100V NH	OF15182550
C201	U		FILM 1800pF 100V PP APSV	OF15182540
C202		4822 121 70437	FILM 1000pF J 100V APSV	OF15102540
C203		9965 000 05891	FILM 470pF 100V PP APSV	OF15471540
C211	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C211	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C211	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C211	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C212	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C212	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C212	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C212	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C251	F		FILM 1800pF 100V PP APSV	OF15182540
C251	N	9965 000 10845	FILM 1800pF J 100V NH	OF15182550
C251	S	9965 000 10845	FILM 1800pF J 100V NH	OF15182550
C251	U		FILM 1800pF 100V PP APSV	OF15182540
C252		4822 121 70437	FILM 1000pF J 100V APSV	OF15102540
C253		9965 000 05891	FILM 470pF 100V PP APSV	OF15471540
C261	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C261	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C261	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C261	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C262	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C262	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C262	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C262	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C301	F		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C301	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C301	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C301	U		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C302	F		FILM 150pF ±5% 100V	OF55151540
			OFC LEAD APF	
C302	N	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C302	S	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C302	U		FILM 150pF ±5% 100V	OF55151540
			OFC LEAD APF	
C317	F		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C317	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C317	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C317	U		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C321	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C321	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C321	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C321	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C322	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C322	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C322	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C322	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C351	F		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD	
C351	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C351	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C351	U		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C352	F		FILM 150pF ±5% 100V	OF55151540
			OFC LEAD APF	
C352	N	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C352	S	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C352	U		FILM 150pF ±5% 100V	OF55151540
			OFC LEAD APF	
C367	F		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C367	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C367	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C367	U		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C371	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C371	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C371	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C371	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C372	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C372	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C372	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C372	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550

NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
C401	F		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C401	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C401	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C401	U		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C402	F		FILM 150pF ±5% 100V	OF55151540
			OFC LEAD APF	
C402	N	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C402	S	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C402	U		FILM 150pF ±5% 100V	OF55151540
			OFC LEAD APF	
C417	F		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C417	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C417	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C417	U		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C421	F	4822 124 90051	ELECT. 220µF M 25V ARA	OA22702550
C421	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C421	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C421	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C422	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C422	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C422	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C422	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C451	F		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C451	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C451	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C451	U		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C452	F		FILM 150pF ±5% 100V	OF55151540
			OFC LEAD APF	
C452	N	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C452	S	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C452	U		FILM 150pF ±5% 100V	OF55151540
			OFC LEAD APF	
C467	F		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C467	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C467	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C467	U		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C471	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C471	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C471	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C471	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C472	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C472	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C472	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C472	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C501	F		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C501	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C501	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C501	U		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C502	F		FILM 150pF ±5% 100V	OF55151540
			OFC LEAD APF	
C502	N	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C502	S	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C502	U		FILM 150pF ±5% 100V	OF55151540
			OFC LEAD APF	
C517	F		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C517	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C517	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C517	U		FILM 560pF ±5% 100V	OF55561540

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			OFC LEAD APF	
C521	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C521	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C521	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C521	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C522	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C522	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C522	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C522	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C551	F		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C551	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C551	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C551	U		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C552	F		FILM 150pF ±5% 100V	OF55151540
			OFC LEAD APF	
C552	N	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C552	S	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C552	U		FILM 150pF ±5% 100V	OF55151540
			OFC LEAD APF	
C567	F		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C567	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C567	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C567	U		FILM 560pF ±5% 100V	OF55561540
			OFC LEAD APF	
C571	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C571	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C571	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C571	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C572	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C572	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C572	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C572	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C601		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C602		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C604	N	8220 200 62290	FILM 100pF J 100V	OF15101550
C604	S	8220 200 62290	FILM 100pF J 100V	OF15101550
C604	U	9965 000 01344	FILM 100pF J 100V APSV	OF15101540
C611		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C612		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C614	N	8220 200 62290	FILM 100pF J 100V	OF15101550
C614	S	8220 200 62290	FILM 100pF J 100V	OF15101550
C614	U	9965 000 01344	FILM 100pF J 100V APSV	OF15101540
C621		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C622		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C624	N	8220 200 62290	FILM 100pF J 100V	OF15101550
C624	S	8220 200 62290	FILM 100pF J 100V	OF15101550
C624	U	9965 000 01344	FILM 100pF J 100V APSV	OF15101540
C631		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C632		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C634	N	8220 200 62290	FILM 100pF J 100V	OF15101550
C634	S	8220 200 62290	FILM 100pF J 100V	OF15101550
C634	U	9965 000 01344	FILM 100pF J 100V APSV	OF15101540
C641		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C642		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C644	N	8220 200 62290	FILM 100pF J 100V	OF15101550
C644	S	8220 200 62290	FILM 100pF J 100V	OF15101550
C644	U	9965 000 01344	FILM 100pF J 100V APSV	OF15101540
C651		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C652		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C654	N	8220 200 62290	FILM 100pF J 100V	OF15101550
C654	S	8220 200 62290	FILM 100pF J 100V	OF15101550
C654	U	9965 000 01344	FILM 100pF J 100V APSV	OF15101540
C701	F		FILM 1800pF 100V PP APSV	OF15182540
C701	N	9965 000 10845	FILM 1800pF J 100V NH	OF15182550
C701	S	9965 000 10845	FILM 1800pF J 100V NH	OF15182550

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
C701	U		FILM 1800pF 100V PP APSV	OF15182540
C702		4822 121 70437	FILM 1000pF J 100V APSV	OF15102540
C703		9965 000 05891	FILM 470pF 100V PP APSV	OF15471540
C711	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C711	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C711	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C711	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C712	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C712	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C712	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C712	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C751	F		FILM 1800pF 100V PP APSV	OF15182540
C751	N	9965 000 10845	FILM 1800pF J 100V NH	OF15182550
C751	S	9965 000 10845	FILM 1800pF J 100V NH	OF15182550
C751	U		FILM 1800pF 100V PP APSV	OF15182540
C752		4822 121 70437	FILM 1000pF J 100V APSV	OF15102540
C753		9965 000 05891	FILM 470pF 100V PP APSV	OF15471540
C761	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C761	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C761	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C761	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C762	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C762	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C762	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C762	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
CD01	F	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD01	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD01	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD01	U	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD02		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD03		9965 000 05913	CER. 22pF ±2.0% 50V	DD942203A0
CD04		9965 000 05913	CER. 22pF ±2.0% 50V	DD942203A0
CD05		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD06		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD07		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD08		9965 000 06692	CER. 20pF CH	DD95200300
CD09		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD11		4822 122 33753	CER. 150pF ±5% CG 50V GR39	DD95151300
CD12		4822 122 33753	CER. 150pF ±5% CG 50V GR39	DD95151300
CD17		4822 122 33753	CER. 150pF ±5% CG 50V GR39	DD95151300
CD18		4822 122 33753	CER. 150pF ±5% CG 50V GR39	DD95151300
CD21		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD23	F	4822 124 22039	ELECT. 220µF 16V ARA	OA22701650
CD23	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
CD23	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
CD23	U	4822 124 22039	ELECT. 220µF 16V ARA	OA22701650
CD24	F	4822 124 22241	ELECT. 47µF 16V ARA	OA47601650
CD24	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD24	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD24	U	4822 124 22241	ELECT. 47µF 16V ARA	OA47601650
CD31		4822 124 90353	ELECT. 100µF M 10V RA-2	OA10701020
CD32		4822 124 90352	ELECT. 10µF M 16V RA-2	OA10601620
CD33		4822 124 90353	ELECT. 100µF M 10V RA-2	OA10701020
CD41	F	9965 000 01318	ELECT. 220µF M 10V RA-2	OA22701020
CD41	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD41	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD41	U	9965 000 01318	ELECT. 220µF M 10V RA-2	OA22701020
CD42		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD43	F	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD43	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD43	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD43	U	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD44		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD45		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD46	F	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD46	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD46	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD46	U	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
CD47		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD48	F	4822 124 22237	ELECT. 10µF 16V ARA	OA10601650
CD48	N	4822 124 80543	ELECT. 10µF 35V ARS	OA10603540
CD48	S	4822 124 80543	ELECT. 10µF 35V ARS	OA10603540
CD48	U	4822 124 22237	ELECT. 10µF 16V ARA	OA10601650
CD49		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD51	F	9965 000 01318	ELECT. 220µF M 10V RA-2	OA22701020
CD51	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD51	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD51	U	9965 000 01318	ELECT. 220µF M 10V RA-2	OA22701020
CD52		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD53	F	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD53	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD53	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD53	U	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD54		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD55		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD56	F	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD56	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD56	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD56	U	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD57		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD58	F	4822 124 22237	ELECT. 10µF 16V ARA	OA10601650
CD58	N	4822 124 80543	ELECT. 10µF 35V ARS	OA10603540
CD58	S	4822 124 80543	ELECT. 10µF 35V ARS	OA10603540
CD58	U	4822 124 22237	ELECT. 10µF 16V ARA	OA10601650
CD59		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD61	F	9965 000 01318	ELECT. 220µF M 10V RA-2	OA22701020
CD61	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD61	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD61	U	9965 000 01318	ELECT. 220µF M 10V RA-2	OA22701020
CD62		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD63	F	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD63	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD63	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD63	U	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD64		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD65		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD66	F	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD66	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD66	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD66	U	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD67		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD68	F	4822 124 22237	ELECT. 10µF 16V ARA	OA10601650
CD68	N	4822 124 80543	ELECT. 10µF 35V ARS	OA10603540
CD68	S	4822 124 80543	ELECT. 10µF 35V ARS	OA10603540
CD68	U	4822 124 22237	ELECT. 10µF 16V ARA	OA10601650
CD69		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD71		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD72		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD91 ~ CD96			CER. 0.01µF	DK98103300
			PP16-RESISTORS	
R104		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R105		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R106		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R107		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R108		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R109		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R110		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R111		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R112		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R154		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R155		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R156		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R157		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R158		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110

NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
R159		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R160		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R161		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R162		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R204		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R205		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R206		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R207		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R208		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R209		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R210		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R211		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R212		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R254		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R255		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R256		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R257		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R258		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R259		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R260		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R261		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R262		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R304		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R305		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R306		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R307		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R308		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R309		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R310		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R311		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R312		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R354		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R355		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R356		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R357		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R358		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R359		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R360		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R361		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R362		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R404		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R405		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R406		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R407		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R408		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R409		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R410		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R411		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R412		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R454		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R455		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R456		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R457		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R458		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R459		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R460		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R461		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R462		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R504		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R505		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R506		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R507		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R508		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R509		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R510		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R511		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
R512		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R554		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R555		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R556		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R557		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R558		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R559		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R560		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R561		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R562		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R602		4822 117 10833	CHIP 10kΩ ±5% 1/10W	NI05103110
R603		4822 111 90896	CHIP 100kΩ ±5% 1/10W	NI05104110
R612		4822 117 10833	CHIP 10kΩ ±5% 1/10W	NI05103110
R613		4822 111 90896	CHIP 100kΩ ±5% 1/10W	NI05104110
R622		4822 117 10833	CHIP 10kΩ ±5% 1/10W	NI05103110
R623		4822 111 90896	CHIP 100kΩ ±5% 1/10W	NI05104110
R632		4822 117 10833	CHIP 10kΩ ±5% 1/10W	NI05103110
R633		4822 111 90896	CHIP 100kΩ ±5% 1/10W	NI05104110
R642		4822 117 10833	CHIP 10kΩ ±5% 1/10W	NI05103110
R643		4822 111 90896	CHIP 100kΩ ±5% 1/10W	NI05104110
R652		4822 117 10833	CHIP 10kΩ ±5% 1/10W	NI05103110
R653		4822 111 90896	CHIP 100kΩ ±5% 1/10W	NI05104110
R704		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R705		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R706		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R707		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R708		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R709		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R710		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R711		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R712		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R754		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R755		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R756		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R757		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R758		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R759		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R760		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R761		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R762		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
RD01		4822 051 30105	CHIP 1MΩ ±5% 1/16W	NN05105610
RD02		4822 051 30221	CHIP 220Ω ±5% 1/16W	NN05221610
RD03		4822 116 82487	CHIP 0Ω ±5% 1/16W	NN05000610
RD04		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
RD05		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
RD06		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
RD07		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RD08		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RD09		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
RD11				
~		4822 051 30339	CHIP 33Ω ±5% 1/16W	NN05330610
RD18				
RD20				
~		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RD30				
⚠ RD31		4822 051 20338	FUSIBLE 3.3Ω ±5% 1/10W	NH85033110
RD32		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RD33		4822 051 30563	CHIP 56kΩ ±5% 1/16W	NN05563610
RD34		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
RD35		4822 051 30152	CHIP 1.5kΩ ±5% 1/16W	NN05152610
RD36		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
RD39		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
RD41		4822 116 82487	CHIP 0Ω ±5% 1/16W	NN05000610
RD42		4822 116 82487	CHIP 0Ω ±5% 1/16W	NN05000610
RD43		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RD46		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
RD51		4822 116 82487	CHIP 0Ω ±5% 1/16W	NN05000610

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
RD52		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RD53		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RD56		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
RD61		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RD62		4822 116 82487	CHIP 0Ω ±5% 1/16W	NN05000610
RD63		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RD66		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
RD71				
∫		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RD75				
RD76		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
RD77		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RD78		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
RD79		4822 117 12139	CHIP 22Ω ±5% 1/16W	NN05220610
RD80		4822 117 12891	CHIP 220kΩ ±5% 1/16W	NN05224610
RD81				
∫		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RD85				
RD86		4822 051 30101	CHIP 100Ω ±5% 1/16W	NN05101610
RD87		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
RD88		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
RD89		4822 117 12139	CHIP 22Ω ±5% 1/16W	NN05220610
RD90		4822 117 12891	CHIP 220kΩ ±5% 1/16W	NN05224610
			PP16-SEMICONDUCTORS	
D101		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D102		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D103		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D151		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D152		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D153		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D201		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D202		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D203		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D251		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D252		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D253		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D301		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D302		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D303		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D351		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D352		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D353		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D401		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D402		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D403		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D451		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D452		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D453		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D501		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D502		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D503		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D551		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D552		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D553		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D601		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D621		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
D641		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D701		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D702		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D703		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D751		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
D752		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
D753		4822 130 81324	CHIP DIODE 1SS302	HZ20018050
DD21		4822 130 83715	CHIP DIODE 1SS301 DAN202U	HZ21005000
DD23		9965 000 09763	DIODE SHOTTKY	HD20055100
			11EQS10 1A 100V	
DN31		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
DN32		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
DN33		4822 130 32362	DIODE 1SS176 MA165 1SS254	HD20002000
			30V 0.1A	
Q101		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0
Q102		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0
Q103		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q104		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q105		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0
Q106		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0
Q107		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0
Q151		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0
Q152		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0
Q153		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q154		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q155		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0
Q156		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0
Q157		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0
Q201		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0
Q202		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0
Q203		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q204		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q205		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0
Q206		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0
Q207		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0
Q251		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0
Q252		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0
Q253		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q254		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q255		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0
Q256		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0
Q257		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0
Q301		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0
Q302		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0
Q303		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q304		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q305		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0
Q306		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0
Q307		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0
Q351		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0
Q352		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0
Q353		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q354		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q355		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0
Q356		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0
Q357		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0
Q401		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0
Q402		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0
Q403		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q404		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q405		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0

NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
Q406		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0
Q407		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0
Q451		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0
Q452		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0
Q453		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q454		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q455		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0
Q456		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0
Q457		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0
Q501		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0
Q502		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0
Q503		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q504		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q505		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0
Q506		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0
Q507		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0
Q551		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0
Q552		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0
Q553		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q554		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q555		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0
Q556		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0
Q557		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0
Q701		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0
Q702		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0
Q703		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q704		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q705		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0
Q706		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0
Q707		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0
Q751		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0
Q752		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0
Q753		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q754		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0
Q755		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0
Q756		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0
Q757		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0
QD01		9965 000 06673	IC TC7WHU04FU	HC008005K0
QD02		9965 000 04632	IC TC74VHC00FS	HC005105K0
QD03		9965 000 04632	IC TC74VHC00FS	HC005105K0
QD04		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QD05		9965 000 06674	IC TC7WH74FU	HC007905K0
QD06		9965 000 06673	IC TC7WHU04FU	HC008005K0
			TRIPLE INVERTER	
QD21		5322 209 11578	IC PCF8574T I/O EXPANDER	HC10068490
QD22		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
⚠ QD23		9965 000 03397	IC BA033FP 3.3V 1A PD=1W	HC96J33210
QD32		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QD35		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QD36		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QD37		4822 130 43818	TRS. 2SC2878 A OR B RANK	HT328782A0
QD38		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QD41		9965 000 06675	IC CS4397 24BIT 192kHz DAC	HC10008880
QD51		9965 000 06675	IC CS4397 24BIT 192kHz DAC	HC10008880
QD61		9965 000 06675	IC CS4397 24BIT 192kHz DAC	HC10008880
QD71		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QD72		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QD73		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QD74		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QD75		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QD76		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QD77		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QD78		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
			PP16-MISCELLANEOUS	
L602		9965 000 06669	RELAY ED2-12NU	LY20120620
L622		9965 000 06669	RELAY ED2-12NU	LY20120620
L642		9965 000 06669	RELAY ED2-12NU	LY20120620
LD01		4822 158 60654	FERRITE CORE BLM31A02	FC90030070
			CHIP INDUCTOR	
LD02		4822 158 60654	FERRITE CORE BLM31A02	FC90030070
			CHIP INDUCTOR	
LD41		9965 000 03109	FERRITE CORE	FC90020100
			FB M J2125HM330-T	
LD51		9965 000 03109	FERRITE CORE	FC90020100
			FB M J2125HM330-T	
LD61		9965 000 03109	FERRITE CORE	FC90020100
			FB M J2125HM330-T	
LN31		9965 000 06669	RELAY ED2-12NU	LY20120620
LN32		9965 000 06669	RELAY ED2-12NU	LY20120620
LN33		9965 000 06669	RELAY ED2-12NU	LY20120620
SD71		9965 000 06676	SLIDE SW. SSSF113-S06N1	SS01030300
XD01		9965 000 06677	CRYSTAL 16.9344MHz UM-5	JX16001270
			PY16-FRONT CIRCUIT BOARD	
			PY16-CAPACITORS	
CY01		4822 124 41539	ELECT. 47μF M 16V RA-2	OA47601620
CY02		9965 000 08352	CER. 0.1μF 50V F	DK98104300
CY03		4822 124 22276	ELECT. 47μF M 50V RA-2	OA47605020
CY04		9965 000 08352	CER. 0.1μF 50V F	DK98104300
CY05		4822 122 33761	CER. 22pF ±5% CG 50V GR39	DD95220300
CY06		4822 122 33761	CER. 22pF ±5% CG 50V GR39	DD95220300
CY11		4822 126 11687	CER. 0.1μF GRM39F104Z16	DK98104200
CY12		9965 000 08352	CER. 0.1μF 50V F	DK98104300
CY20		4822 124 90352	ELECT. 10μF M 16V RA-2	OA10601620
CY21		5322 126 11578	CER. 1000pF ±10% B 50V	DK96102300
CY22		4822 126 12105	CER. 0.033μF ± 10%	DK96333200
CY23		5322 126 11578	CER. 1000pF ±10% B 50V	DK96102300
CY30		4822 124 41539	ELECT. 47μF M 16V RA-2	OA47601620
CY31		4822 126 12105	CER. 0.033μF ± 10%	DK96333200
CY32		4822 122 33761	CER. 22pF ±5% CG 50V GR39	DD95220300
CY33		4822 124 90362	ELECT. 22μF M 50V RA-2	OA22605020
CY34		4822 124 90362	ELECT. 22μF M 50V RA-2	OA22605020
CY50		4822 124 90353	ELECT. 100μF M 10V RA-2	OA10701020
CY51		4822 126 11687	CER. 0.1μF GRM39F104Z16	DK98104200
CY70		4822 122 31765	CER. 100pF ±5% CG 50V GR39	DD95101300
CY71		4822 122 31765	CER. 100pF ±5% CG 50V GR39	DD95101300
CY72		4822 122 31765	CER. 100pF ±5% CG 50V GR39	DD95101300
			PY16-RESISTORS	
RY01		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY03		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY10		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
RY11		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY12		4822 116 83829	CHIP 270Ω ±5% 1/16W	NN05271610
RY13		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
RY14		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY15		4822 116 83829	CHIP 270Ω ±5% 1/16W	NN05271610
RY20		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610
RY21		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY23		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
RY25		4822 051 30109	CHIP 10Ω ±5% 1/16W	NN05100610
RY26		4822 051 30109	CHIP 10Ω ±5% 1/16W	NN05100610
RY27		4822 051 30109	CHIP 10Ω ±5% 1/16W	NN05100610
RY28		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
RY30		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
RY31		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY32				
∫		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
RY37				
RY38		4822 051 30471	CHIP 470Ω ±5% 1/16W	NN05471610
RY39		4822 051 30471	CHIP 470Ω ±5% 1/16W	NN05471610
RY40		4822 051 30109	CHIP 10Ω ±5% 1/16W	NN05100610
RY41		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY42		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
RY43		4822 051 30121	CHIP 120Ω ±5% 1/16W	NN05121610
RY45		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
RY50		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
RY51		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RY52		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610
RY53		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
RY54		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY55		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY56		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
RY57		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
RY60 ∫ RY66		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
RY67		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY70		4822 117 12864	CHIP 82kΩ ±5% 1/16W	NN05823610
RY71		4822 117 12864	CHIP 82kΩ ±5% 1/16W	NN05823610
RY72		4822 117 12864	CHIP 82kΩ ±5% 1/16W	NN05823610
RY80		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
RY81		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY82		4822 116 83829	CHIP 270Ω ±5% 1/16W	NN05271610
RY83		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
RY84		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY85		4822 116 83829	CHIP 270Ω ±5% 1/16W	NN05271610
			PY16-SEMICONDUCTORS	
DY01		9965 000 07640	CHIP DIODE UDZ-10B	HZ30009210
DY02		9965 000 01598	CHIP DIODE UDZS8.2B MA8082-M	HZ30821000
DY10		4822 130 80326	L.E.D. LT3D8B RED 3O	HI10062320
DY11		4822 130 80326	L.E.D. LT3D8B RED 3O	HI10062320
DY20		4822 130 83715	CHIP DIODE 1SS301 DAN202U	HZ21005000
DY80		4822 130 80326	L.E.D. LT3D8B RED 3O	HI10062320
DY81		4822 130 80326	L.E.D. LT3D8B RED 3O	HI10062320
⚠ QY01		9965 000 04975	IC NJM79L24A:0.1A-24V	HC39124090
QY10		9965 000 10841	MICROPROCESSOR TMP87CH74F FL DRIVER	HU413KT000
QY11		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QY12		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QY20		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QY30		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QY31		4822 130 43954	CHIP TR.(2SD) 2SD999	HX409992A0
QY32		4822 130 42734	CHIP TR.(2SB) 2SB798 DL DK	HX207982A0
QY40		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QY51		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QY52		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QY70		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QY71		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QY72		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QY80		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QY81		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
			PY16-MISCELLANEOUS	
LY01		9965 000 03109	FERRITE CORE FB M J2125HM330-T	FC90020100
SY01 ∫ SY10		4822 276 13408	PUSH SW. SKHVBF 260GF RED	SP01012030
VY01		2722 171 07718	DISPLAY UNIT FTD 15-MT-67GNK	HQ31209410
XY01		2422 540 98518	CER. VIB. CSTS MG 8MHz 15pF	FQ08004060
ZY01		9965 000 06833	PHOTO UNIT RPM6936-H4	HW10008210
			PY26-POWER SW. CIRCUIT BOARD	
DY40		4822 130 80326	L.E.D. LT3D8B RED 3O	HI10062320
RY44		4822 051 30121	CHIP 120Ω ±5% 1/16W	NN05121610
SY40		9965 000 10847	PUSH SW. SPPH430100	SP02022310

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